Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

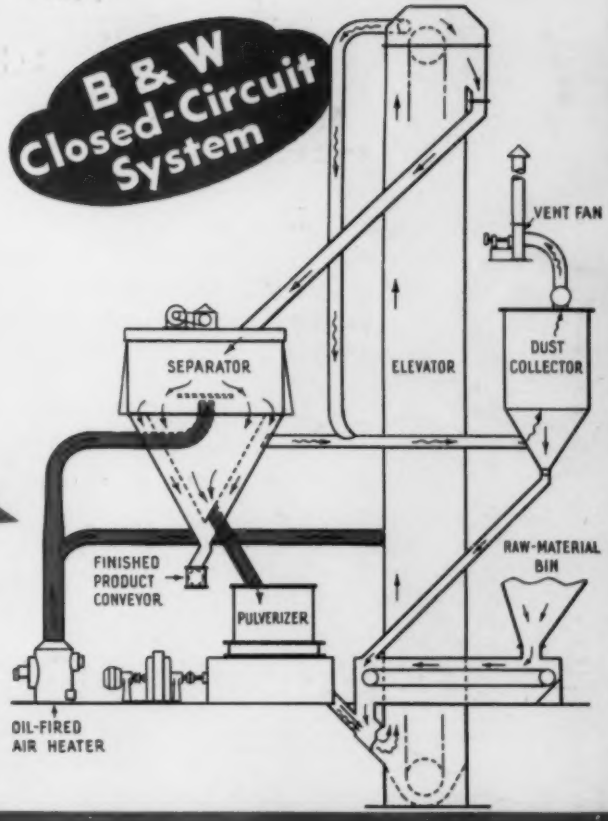
1st Copy to Periodical Div. APR 24 1941

Red Line Shows the Way to Economy

Raw material can now be dried and ground automatically and simultaneously

- Separate drying equipment is eliminated.
- Low fuel costs are assured; fuel consumption may be as low as one-third that of former method.
- Substantial circulating load means a thoroughly mixed product.
- B&W Pulverizers are now available IN ALL SIZES with new Gravity Discharge.

Arrows on the drawing show the path of hot air and dust-laden gases. Hot air is shown in red.



THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET . . NEW YORK, N. Y.

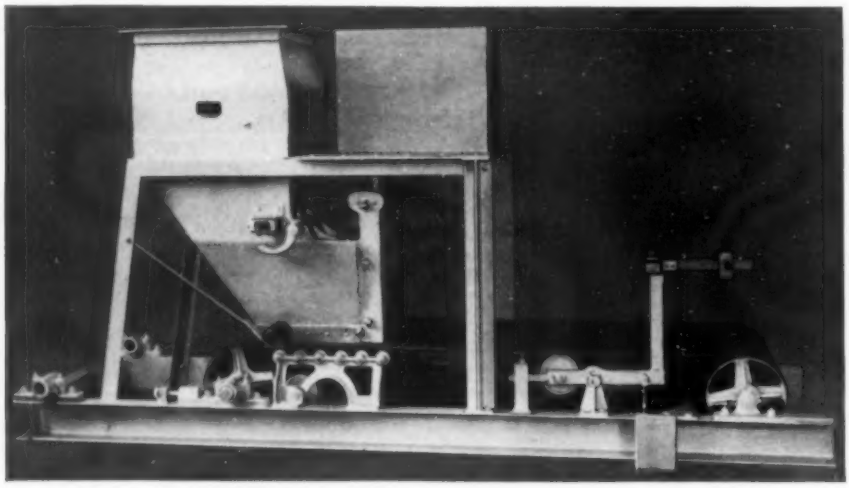
C-38

BABCOCK & WILCOX

SCHAFFER

ELECTRICALLY CONTROLLED POIDOMETERS

NOW OPERATING IN SEVERAL PLANTS



POIDOMETER EQUIPPED WITH
MOTOR OPERATED REGULATING GATE

This new type of gate is operated by a reversing motor and switch, controlled by a set of micro switches connected with the weighing beams. When the load on the scale platform varies from the scale setting, the weighing beam deflects from its normal horizontal position and makes contact with one of the micro switches, starting the gate in motion. The gate continues to move in the same direction (either opening or closing, depending on whether load on the scale platform is light or heavy) until proper balance is reached.

This new type Poidometer is especially recommended for material such as stone and clinker that contains cubes of various sizes. Tests have shown that exceptional accuracy is obtained when handling this type of material.

Write for Bulletin—2-A.

SCHAFFER POIDOMETER COMPANY

2828 SMALLMAN ST. PITTSBURGH, PA.

DU PONT ANNOUNCES
A New Type of "NITRAMON"

"NITRAMON"A *has greater density—gives more wallop and weight where it counts: at the bottom of the hole*

HERE'S a new Du Pont development that offers quarrymen still better blasting results. It's the new "Nitramon"A . . . another, specialized form of "Nitramon," the *safer* blasting agent used by more and more quarrymen every year.

"Nitramon"A has greater weight and density than regular "Nitramon"—developed to pack more power into the bottom of bore holes—to get a lustier punch at the toe of the burden.

Like all grades of "Nitramon," the new "Nitramon"A is both efficient and economical. Its high velocity gives excellent fragmentation, reduces the costs of secondary shooting. It has the same "Nitramon" safety features. It cannot be detonated by flame, friction, impact, Primacord or the strongest commercial blasting cap. It is detonated by a special "Nitramon" Primer. "Nitramon" will not freeze. It is waterproof—sealed in metal containers.

This new type of "Nitramon" is still *another* Du Pont development to help you bring down more profitable stone at lower cost. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

"NITRAMON"

THE SAFER BLASTING AGENT

APR 22 1941

©CIB 495561

Rock Products

Recognized the World Over as the Leader in Its Field

With which has been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

VOL. 44, No. 4. APRIL, 1941

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Impartial measurement of reader interest in terms of paid circulation.

★

Authentic facts relating to editorial scope and readership analysis.

(PUBLISHED MONTHLY AT CHICAGO, ILL., U. S. A.)

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It's the COST PER TON *that counts*

.... *in* S-A *material handling* -

Every *low cost per ton* material handling job was once "just an idea."

To transform the idea into low cost handling requires two things —*sound engineering* and *quality equipment*.

Stephens-Adamson has for years, and still is, using its vast storehouse of these basic elements to place in operation outstanding installations the world over.

Consideration of this yardstick—"IT'S THE COST PER TON OVER THE LIFE OF THE EQUIPMENT THAT COUNTS"—assures our clients' best interests being served.

May we help you?

Two views of ballast plant for Utah Sand and Gravel Company in the hills of Wyoming, built by Stephens-Adamson.

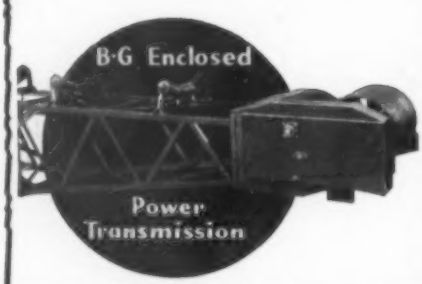
STEPHENS-ADAMSON
— MFG. CO. —
7 Ridgeway Ave. AURORA, ILL.
Los Angeles, Cal. . . . . Belleville, Ont.

Conveying • Elevating • Screening • Transmission Equipment

ENGINEERS SA MANUFACTURERS

STEPHENS-ADAMSON MATERIAL HANDLING

Via Barber-Greenes



B-G Standardized Units include 24" and 42" deep Steel Truss, Enclosed Power Transmission, Head End Drives, Wrap Drives, Various Types of Take-Ups, A Frames, Walkways, etc. All unit parts and assemblies are accurately rated, giving the individuality of a "tailor made" conveyor plus the many additional advantages of standardization.

BELT conveyors offer by far the cheapest means of handling bulk materials. Barber-Greenes offer many additional advantages.

Having Pre-Engineered Standardized Unit Parts and Assemblies, the B-G Sales Engineer is able to make a quicker, more accurate price estimate, the Engineering Department is able to make a quicker, more practical layout.

This B-G Standardization lets us carry the parts in stock for practically any conveyor requirement — giving prompt shipment.

Erection is tremendously speeded up and simplified, and perfect alignment is assured.

B-G Standardization allows the addition of standard accessories later, and Barber-Greene Standardized Sectional Construction permits unequalled change of set-up to meet changing conditions.

B-G Carriers are recognized for their excellent design and performance records. They are available with plain, ball, or roller bearings. If you are replacing carriers or erecting your own conveyor, investigate B-G Carriers.

Solving your handling problems is our business.

Standardized Material-Handling Machines

BARBER GREENE

AURORA, ILLINOIS

38-10

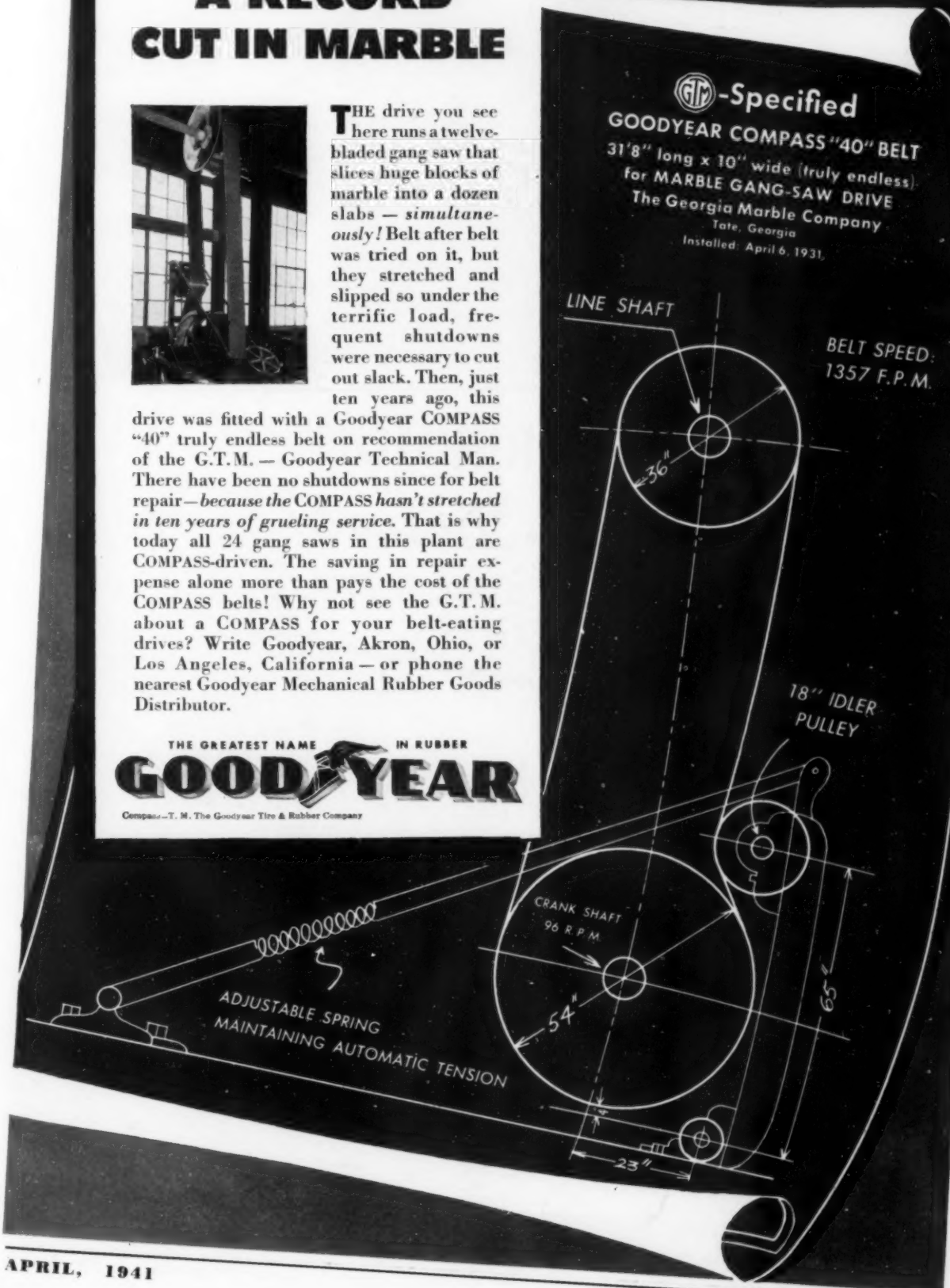
A RECORD CUT IN MARBLE

THE drive you see here runs a twelve-bladed gang saw that slices huge blocks of marble into a dozen slabs — *simultaneously!* Belt after belt was tried on it, but they stretched and slipped so under the terrific load, frequent shutdowns were necessary to cut out slack. Then, just ten years ago, this drive was fitted with a Goodyear COMPASS "40" truly endless belt on recommendation of the G.T.M. — Goodyear Technical Man. There have been no shutdowns since for belt repair—*because the* COMPASS *hasn't stretched in ten years of grueling service.* That is why today all 24 gang saws in this plant are COMPASS-driven. The saving in repair expense alone more than pays the cost of the COMPASS belts! Why not see the G.T.M. about a COMPASS for your belt-eating drives? Write Goodyear, Akron, Ohio, or Los Angeles, California — or phone the nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER

GOODYEAR

Compass—T. M. The Goodyear Tire & Rubber Company



Yes, it made the grade with flying colors!

MARMON-HERRINGTON *All-Wheel-Drives*

—"DO THINGS" NO OTHER TRUCKS OR PASSENGER CARS CAN DO!

Do you need a light truck or passenger car with the agility of a mountain goat? A *heavier* truck with ability to operate with speed and economy "across country" as well as on good roads? A real Mammoth of a truck for transporting big loads over the worst possible going?

Marmon-Herrington builds them all. Converted Ford passenger cars, and light delivery trucks with traction and power applied to the front, as well as the rear wheels. Largest sizes of Ford trucks in either four-wheel-drive or six-wheel-drive models. Enormous, powerful Marmon-Herringtons, capable of carrying 35 ton loads "on their backs," or of pulling a hundred tons or more on trailers.

Each of these vehicles incorporates features of design and construction *found in no other multiple drive vehicles.*

Each has advantages *over all other automotive vehicles* which you should know about. Write for literature. Cable address, MARTON.

MARMON-HERRINGTON CO., INC. • INDIANAPOLIS, INDIANA, U. S. A.

More of the Good Work done with MULTI-STAGE FINE REDUCTION CRUSHERS

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators
Welded or Riveted Stacks, Tanks and Bins for any purpose.

NOTE THESE RESULTS

Following are four examples, taken at random, of results secured with 3'0" machines.

MATERIAL CRUSHED	CLOSED SETTING LOWER STAGE	TPH	HP	PER CENT THRU — SQUARE HOLES					
				¾"	½"	⅜"	¼"	10M	100M
LIMESTONE	7/16"	62	58	86	49	31	19	3	1
SANDSTONE	3/16"	68	63	97	86	69	44	20	9
GRAVEL	7/16"	67	65	90	64	47	34	14	5
TRAP ROCK	5/16"	72	55	99	67	40	21	12	8

Take particular note of the horsepower used. The product in all cases is cubical and remarkably free from slabs.

SEE OUR BULLETIN No. 113

TRAYLOR

ENGINEERING & MANUFACTURING CO.

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HERCOMITE IN THE SPOTLIGHT

REG. U. S. PAT. OFF.

When an explosive shows an average saving of 15% over older types. When its wide range of bulk strengths answers the need for good breakage at low cost in all kinds of rock. When millions and millions of pounds have been used with an outstanding safety record. When it continues to replace older types because of economy, performance, and safety. It's time to take a bow. That's why Hercomite has earned a place in the spotlight.

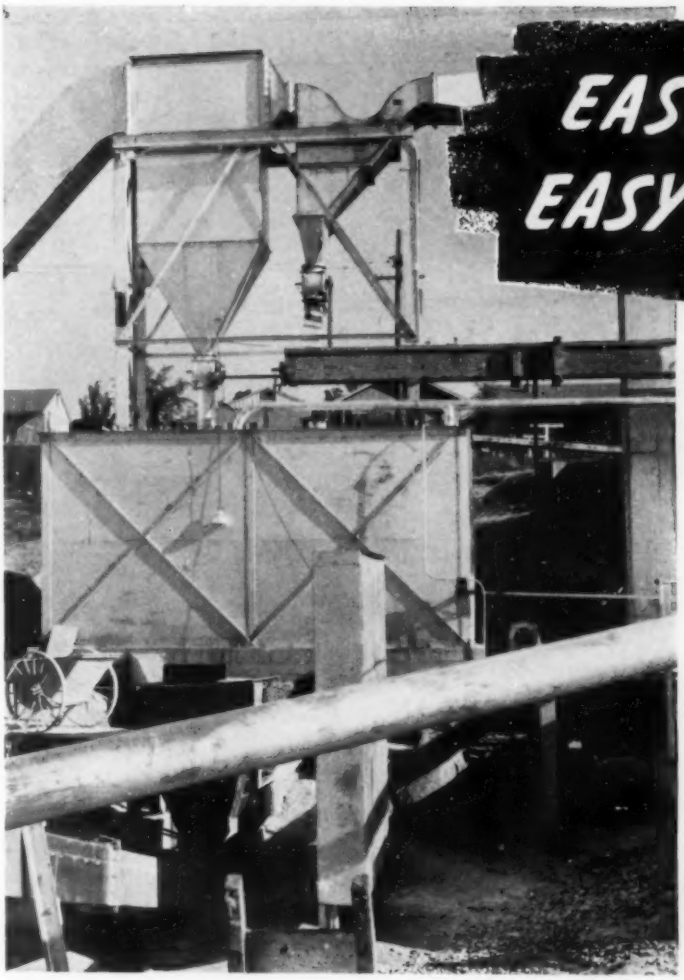
EXPLOSIVES DEPARTMENT

HERCULES POWDER COMPANY

Incorporated

WILMINGTON • DELAWARE

D-12



EASY TO ERECT
EASY TO INSPECT

MULTICLONES cut installation and operating costs. A single inlet, single outlet and common dust discharge simplified the design and made the erection of this Pumicite processing plant at the CALIFORNIA INDUSTRIAL MINERALS COMPANY easy. It minimized duct construction, and reduced draft loss, power consumption and installation cost.

The MULTICLONE shown here is used with a TUR-BUL-AIRE DISPERSION DRYER for drying and classifying wet material (25 to 35% moisture) direct from the deposit. The fine dry product is collected in the MULTICLONE.

VARIED SIZES AND TYPES OF INSTALLATIONS

• MULTICLONE assemblies of 6", 9", or 24" diameter tubes provide a range of collection efficiencies to meet your requirements. The efficiency increases with decrease in tube diameter.

• We have available test units of various sizes for actual demonstration in your plant. Our test units are identical in size to commercial operating installations. Let us explain.

Other Products:

COTTRELL ELECTRICAL PRECIPITATORS
TUR-BU-LAIRE SPRAY DRYERS
TUR-BU-LAIRE DISPERSION DRYERS

EASY TO INSPECT *This hinged* MULTICLONE *of stainless steel makes inspection or cleaning easy. Bag filters have been replaced by 6" Multiclones.*

MULTICLONE
MECHANICAL DUST COLLECTION

WESTERN PRECIPITATION CORPORATION
1016 West Ninth Street, Los Angeles, California

PRECIPITATION COMPANY OF CANADA, LTD.
Dominion Square Building, Montreal

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WESTERN PRECIPITATION CORPORATION
1016 W. Ninth St., Los Angeles, California
Please send Bulletin on Multiclone Dust Collectors.

NAME_____

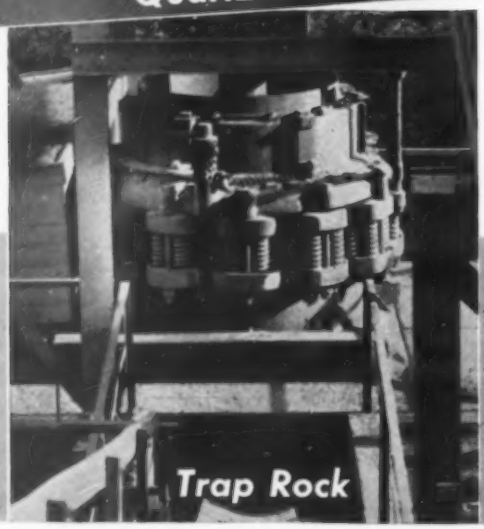
NUMBER_____ STREET

CITY_____ STATE_____

SYMONS SHORT HEAD CONE
for making those minus ½ inch sizes

Limestone

Quartzite


Trap Rock

• • Still the world's outstanding crusher for fine reduction of all materials • •

Making minus half inch material is a field for which the Symons Short Head Cone is primarily adapted. That so many of the larger producers of stone, gravel and slag should standardize on this crusher is evidence of its superiority for this class of work. Producers engaged in making those finer sized materials for black top and other types of stabilized roads will find this crusher exactly suited to their needs. There is no guesswork in the production of these fine materials with Short Heads. Obtain just the sizes you require in quantities that meet your demands and at a crushing cost which will assure of greater profit by doing your fine reduction crushing with a Symons Short Head Cone.

Write us for further particulars on this Short Head Crusher, the solution to your fine crushing problems.

NORDBERG
MFG. COMPANY
MILWAUKEE, WIS.

NEW YORK
60 East 42nd Street

LOS ANGELES
Subway Term. Bldg.

TORONTO
Concourse Bldg.

LONDON
Bush House

You can tell at a glance this is no small-time quarry operation. Thousands of yards of rock have already been moved from this hillside near Alton, Ill., and there's still plenty left. The 2-yd. Lorain shown in the illustration broke ground for this job and has handled every yard of rock turned out since.

This is but one of many ⅜ to 2½-yd. Lorain shovels you will find doing "solo acts" in big-time quarries. It takes plenty of power and a mighty rugged constitution. But Lorains are long on both. Their all-welded steel, torsion-resisting booms are built to buck tough digging. Center Drive design of turntable delivers maximum digging power at the dipper teeth; produces increased capacities for handling more and heavier work; makes possible a simplified construction using fewer and stronger parts. Crawlers are all Center "Chain" Drive. They are long and wide to provide a dependable "base of operations"; travel and steer with surprising speed and ease.

There's a shovel of a size for every quarry service in the ⅜ to 2½-yd. Lorain line—and every one has demonstrated its ability to dig rock over long periods at low cost. Write for catalogs describing these machines today.

THEW CENTER DRIVE

THE THEW SHOVEL CO.
LORAIN, OHIO

3/8 to 2 1/2 Yd. LORAINS

FROM QUARRY TO FINISHED PRODUCT

JEFFREY UNITS PERFORM IMPORTANT FUNCTIONS

Belt conveyors

Bucket elevators

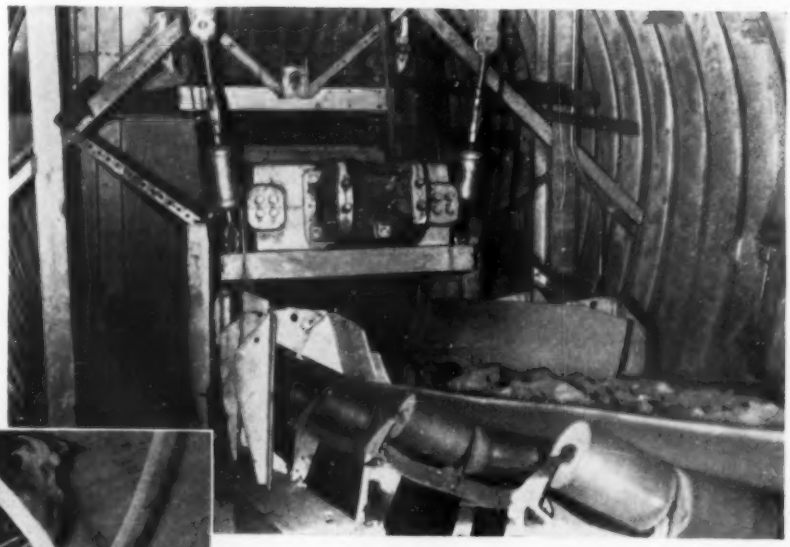
Electric vibrating feeders, conveyors, screens, dryers, coolers and continuous weigh-feeding units

Chains **Crushers**

Sprockets **Pulverizers**

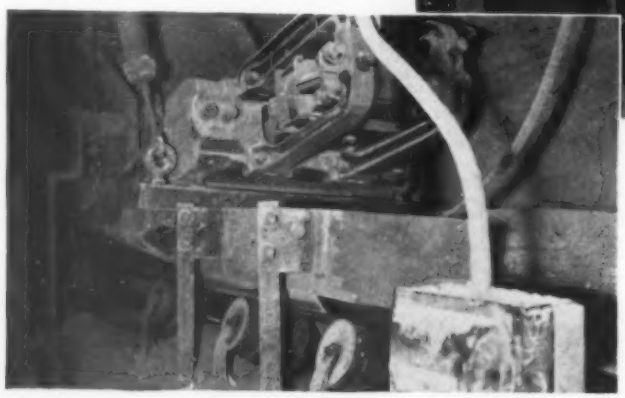
Spiral conveyors

Capacities vary with material and condition

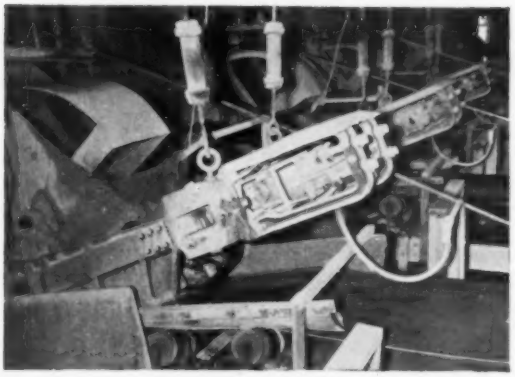


Heavy duty Jeffrey-Traylor feeder reclaiming cement rock. 500 T. P. H. from stock pile to conveyor

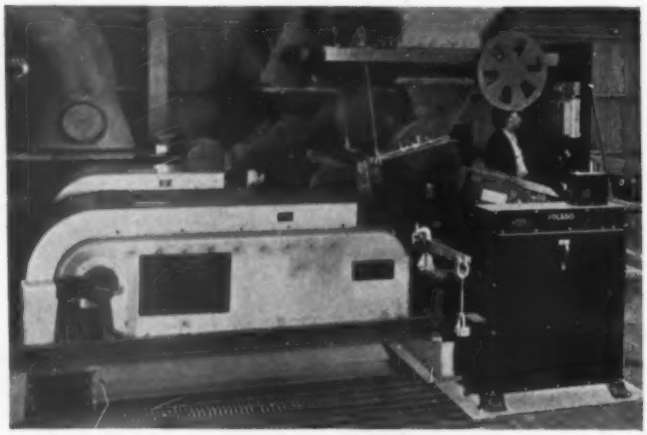
Jeffrey belt and spiral conveyors provide continuous, uninterrupted flow of all kinds of loose material.



Gypsum and clinker delivered to plant by Jeffrey-Traylor electric vibrating feeders. Feed rate by remote control.

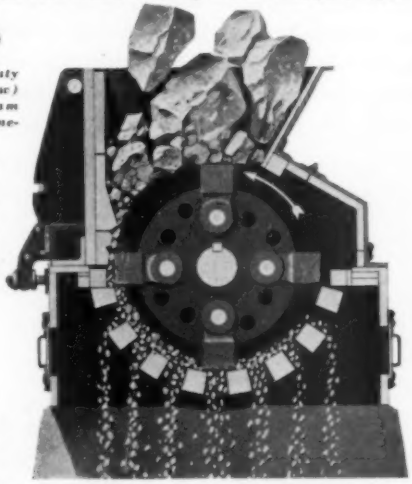


Jeffrey-Traylor electric vibrating feeders are shown above controlling feed rate for sugar rock picking tables, improving efficiency at picking belt. Also electric vibrating screens, conveyors, dryers and coolers.



Jeffrey-Traylor Waytrols are being used extensively for proportioning by weight. May be remotely controlled or controlled by demand of grinding unit.

Jeffrey heavy duty crushers (below) reduce steam shovel size limestone shale in one operation to 1½" and under suitable for storage and for blending as feed to raw grinding mills as in cement mill operation.



Let us send you engineering data covering the Jeffrey unit you need for more efficient and less costly production in your plant.

THE JEFFREY MANUFACTURING CO.

935-99 North Fourth Street • Columbus, Ohio

SALES OFFICES IN PRINCIPAL CITIES

America DIGS IN

When America decided to dig in, her first demand was for cantonments, enlarged factory capacities, airports and air and naval repair bases. Without these fundamental things she could not train her men, build their weapons or sustain her new power.

A dirt-moving job, this all-important preliminary work for the defense of this country. An emergency call for rock-busting, volume-boosting, dirt-moving power and for men to wield that power against time and weather!

"Caterpillar" Diesel power in tractors, engines and road machinery, which was already at work building those things worth fighting for, was ready to create the means with which they could be protected. And while most of the nation groans under an overload, these machines and the men that own them are pitching in on basic defense projects without breaking their stride.

The yardage being moved in this country today would be looked upon as a miracle in any other country in the world. America is really digging in . . . and digging with the tools which have made her famous and which will assure her continued security.

The extension of the defense program places heavy demands on the men in the dirt-moving industry and on the manufacturers who furnish them with the tools for this necessary work . . . big things have been done, big things have yet to be done.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

(ABOVE) • *Whipping winter's worst conditions to expand the Glenn L. Martin Company's plane plant.*

(AT RIGHT) • *Huge scraper-units hasten the building of California's Camp Callan.*

(LOWER LEFT) • *This machine will give an air station fast roads, smooth runways.*

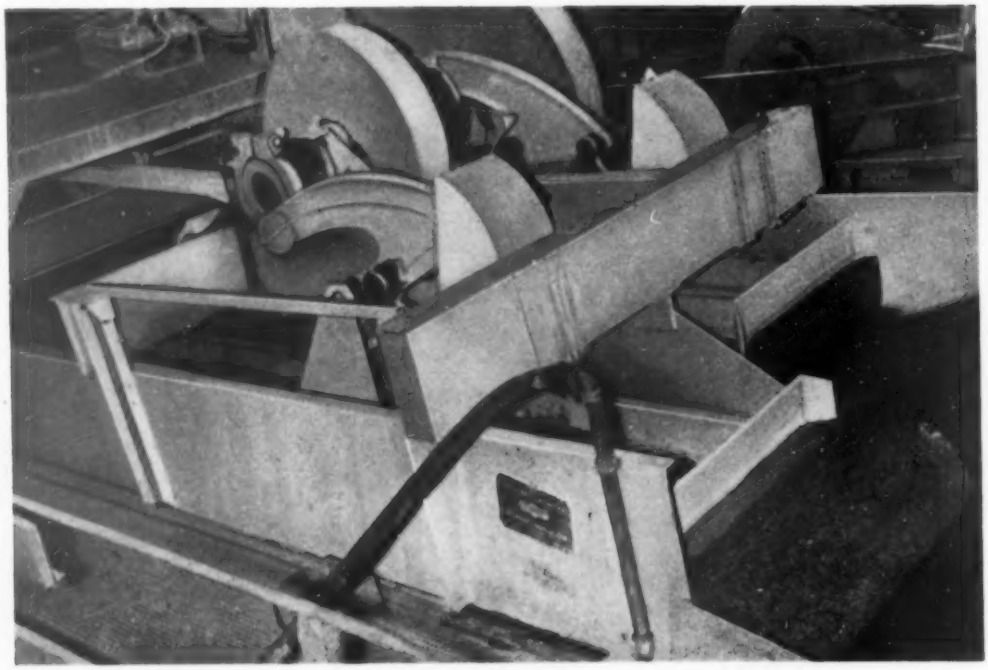
(LOWER RIGHT) • *Jack-hammers powder rock as "Caterpillar" Diesel Engines drive compressors.*

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES AND ELECTRIC SETS • TRACK-TYPE TRACTORS • ROAD MACHINERY

FOR COMMERCIAL SAND PRODUCERS



Dorr Classifier discharging a washed and graded sand fraction ahead of stock piles and blending plant.

"Prescription Sand" OF SHASTA DAM QUALITY

FIRST BOULDER DAM—then Grand Coulee—now Shasta. Three great Federal Reclamation Bureau projects requiring top specification concrete sand, cut to measure by Dorr Systems.

Sand for Shasta's 6,000,000 cu. yards of concrete is being supplied at the rate of 2,000 tons per hour by two Dorr Hydroseparators followed by three Dorr FX Classifiers. The three sand fractions (see box below) are blended to yield a final product of the desired gradation, equivalent to a fineness modulus of 2.73.

SHASTA SAND FRACTIONATION & BLENDING STANDARDS

Three Graded Fractions

No. 1 Dorr Classifier—No. 4 + No. 28 screen—coarse
No. 2 Dorr Classifier—No. 28 + No. 40 screen—medium
No. 3 Dorr Classifier—No. 40 + No. 100 screen—fine

One Composite Blend

Retained on Sieve	Percent Cumulative
No. 4	3
No. 8	15
No. 14	30
No. 28	55
No. 48	77
No. 100	93

Fineness Modulus 2.73

The use of the Dorr System is by no means limited to big projects of Boulder, Grand Coulee and Shasta calibre. Commercial sand and gravel operations as small as 50 tons an hour can obtain the same high standards of performance using smaller Dorr units especially designed for this purpose.

"Making Prescription Sand at 50 tons an Hour," available on request, contains full information on a successful commercial adaptation of Grand Coulee and Shasta Dam practices.

THE DORR COMPANY INC.

ENGINEERS • 570 Lexington Ave., New York

ATLANTA • TORONTO • CHICAGO • DENVER • LOS ANGELES

DORR TECHNICAL SERVICES AND EQUIPMENT ARE AVAILABLE FROM THE FOLLOWING COMPANIES:

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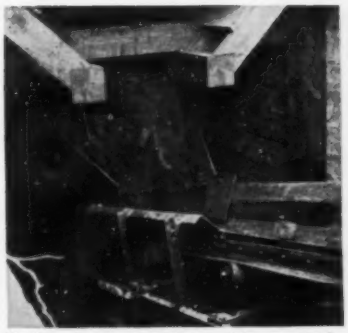
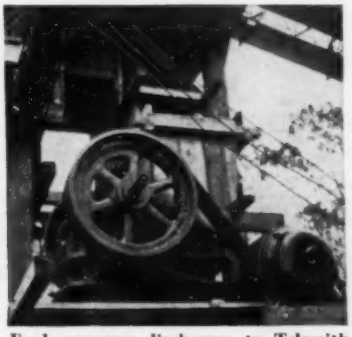
FRANCE: Soc. Dorr-Oliver, Paris
GERMANY: Dorr Gesellschaft, m. b. H. Berlin
ENGLAND: Dorr-Oliver Company Ltd., London
AUSTRALIA: Crossle & Duffy Pty. Ltd., Melbourne
SOUTH AFRICA: Edward L. Bateman Pty. Ltd., Johannesburg
JAPAN: Andrews & George Co. Inc., Tokio
ARGENTINA: Luis Fiore, Buenos Aires
BRAZIL: Oscar Taves & Co., Rio de Janeiro

NEW NAVAL AIR BASE

NEEDS 370,000 YDS. SAND AND GRAVEL



Under hopper with rail-bar grizzly, 30″ x 5′6″ *Telsmith Plate Feeder* regulates flow of material onto belt conveyor feeding scalping and crushing plant.



Feed conveyor discharges to Telsmith Rotary Grizzly and the plus 4″ material that it rejects is crushed by 18″ x 30″ *Telsmith Roller Bearing Jaw Crusher.*

Everything passing No. 450 *Telsmith Rotary Grizzly* flows over 5′ x 10′ *Telsmith Single Deck Pulsator.* Minus 2½″ goes to washing and screening plant . . .

THIS TELSMITH PLANT RUNS 20 HOURS A DAY TO SUPPLY IT

. . . and the oversize from the Telsmith single deck Pulsator vibrating screen (2½″ to 4″) goes through a No. 36 *Telsmith Gyrasphere Crusher.*

Both crushers discharge onto a return conveyor and, at point of transfer to main conveyor, a 3′ x 8′ *Telsmith Double Deck Pulsator* removes fines.

60″ x 18′ *Telsmith Standard Washing Screen* scrubs and sizes gravel. 48″ x 24′ and 36″ x 20′ *Telsmith Sand Drags* wash and dewater sand.

The Navy's new 25 million dollar air base at Quonset Point, R. I., will require about 370,000 yards of washed sand and gravel. This aggregate is being furnished by the Boston Sand & Gravel Co. of Cambridge, Mass., with a brand new and completely modern Telsmith Plant located near East Greenwich, R. I.

Telsmith engineers, in co-operation with the Boston Company officials, designed the plant especially for this job, and all major equipment was furnished by Telsmith. A capacity of 150 T.P.H. was figured but the plant produces as high as 250 T.P.H. Average production is 200 T.P.H. of Navy 1″ and 2″ aggregate and concrete sand—4000 tons per 20-hour day, with plant operating at times at temperature as low as 16° F.

For dependable advice and quick service coupled with the best in equipment, bring your problem to Telsmith.

Write for descriptive Bulletin G-11

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

G-7

50 Church St., New York City
211 W. Wacker Drive, Chicago, Ill.
713 Commercial Trust Bldg., Philadelphia, Pa.
81 Binney St., Cambridge, Mass.
Vern Wheeler Eqpt. Co., Columbus, Ohio
Brandeis M. & S. Co., Louisville, Ky.
Charleston Trac. & Eqpt. Corp., Charleston, W. Va.
Roanoke Trac. & Eqpt. Co., Roanoke, Va.
North Carolina Equip. Co., Raleigh and Statesville, N. C.
Wilson-Weesner-Wilkinson Co., Knoxville and Nashville, Tenn.
G. F. Seeley & Co., Toronto, Ont.

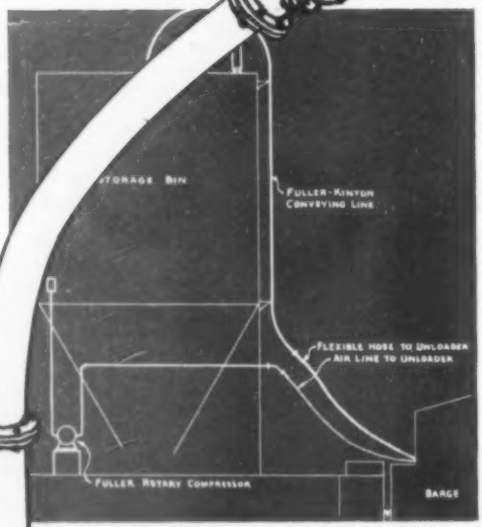
WHEREVER A PIPE LINE CAN BE RUN

OVERHEAD · · · UNDERGROUND

VERTICAL · · · HORIZONTAL

UP AND DOWN HILL

THE FULLER-KINYON SYSTEM



Fuller-Kinyon Remote-Control Unloader recovering and conveying cement from barge to storage. This system in use by a ready-mixed concrete plant in New York City.

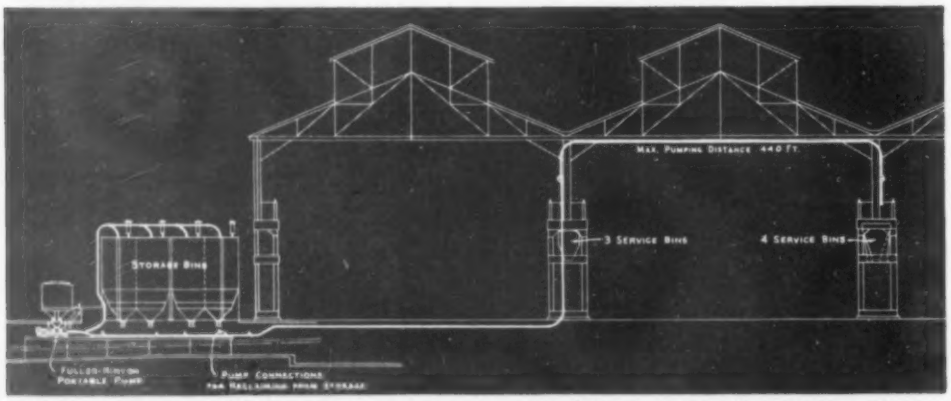
Eliminate conventional, straight-line conveying. Place your conveying lines anywhere . . . cut the corners to shorten conveying distance. Layouts of new plants can be simplified; old plants modernized without interfering with existing buildings and equipment.

The system is safe and dustless. Will load, unload, convey and reclaim practically any dry pulverized material at a low cost per ton.

FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago: 1118 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.



Fuller-Kinyon Type "H" Pump unloading and conveying clay and silica in a steel mill. Materials received in hopper-bottom cars and conveyed to storage. When materials are to be recovered from storage, the pump, mounted on wheels running on a track, is connected to the bin to be emptied and material conveyed to process bins in the plant.

P-49

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · · AIR-QUENCHING COOLERS · · · · BIN SIGNALS

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

for super-severe service

●

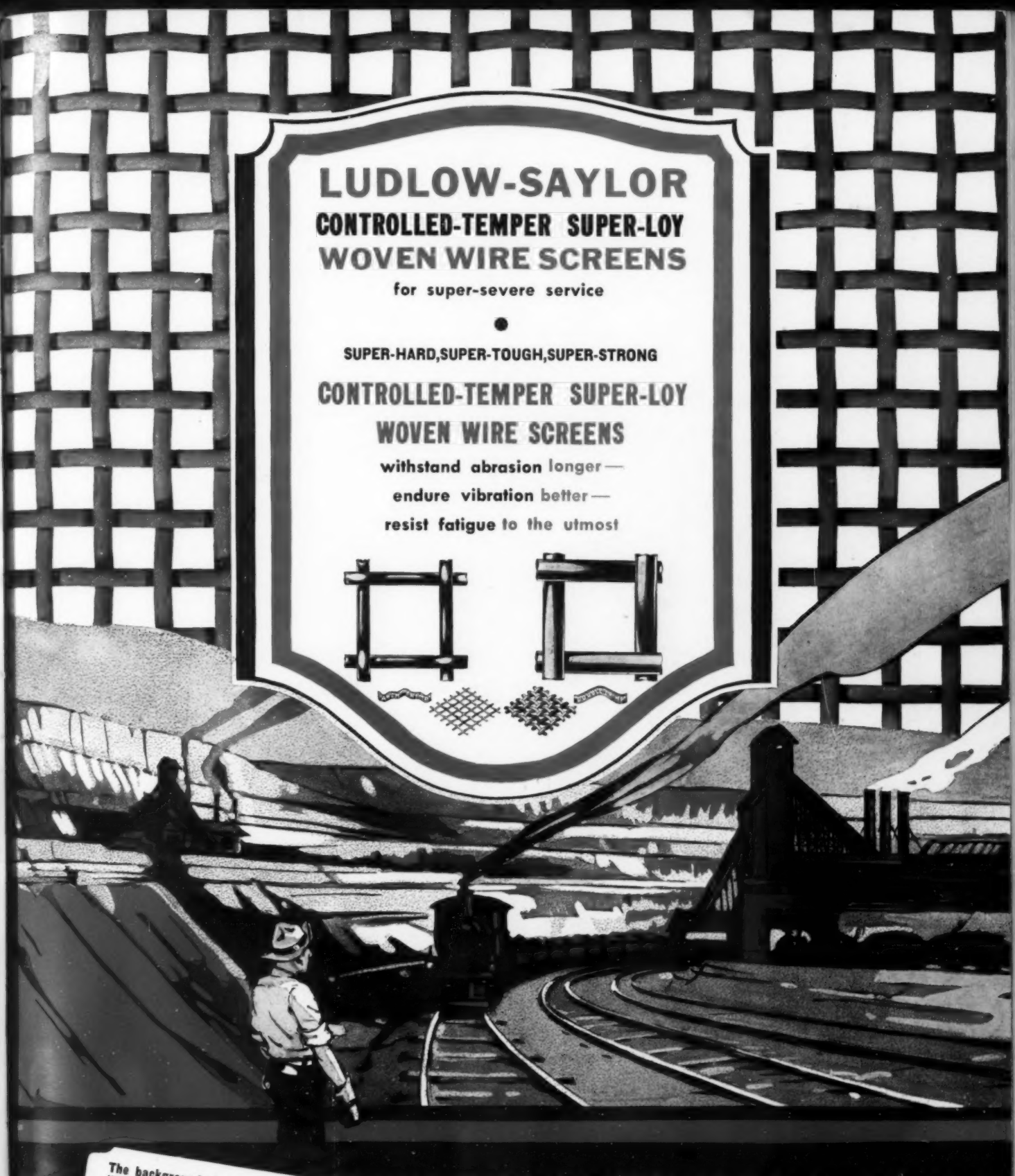
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

withstand abrasion longer—

endure vibration better—

resist fatigue to the utmost



The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

The LUDLOW-SAYLOR WIRE COMPANY SAINT LOUIS

These times demand UNIVERSAL
CRUSHING EQUIPMENT

- There's lots of work to be done in a hurry—training camps, defense projects, new roads and road improvements to handle accelerated traffic, housing projects—it's surely no time to use obsolete equipment and make-shift set-ups.

- "Get in and pitch" with Universal profit-proved equipment. It's geared to the times. There's a Universal Crusher, Pulverizer and Stationary or Portable Plant just suited to your needs that will crush your material any size you want it, wherever you are, faster and at lower cost than any other equipment built to do the job.

- Name any equipment in this complete line and we will show you production and operating cost figures that will convince you if you know anything about the stone and gravel business—not just isolated cases, but testimony aplenty from the roll call of Universal customers.

Up-to-the-minute equipment for high production and economical operation is detailed in this 60-page catalog—send for your copy today!

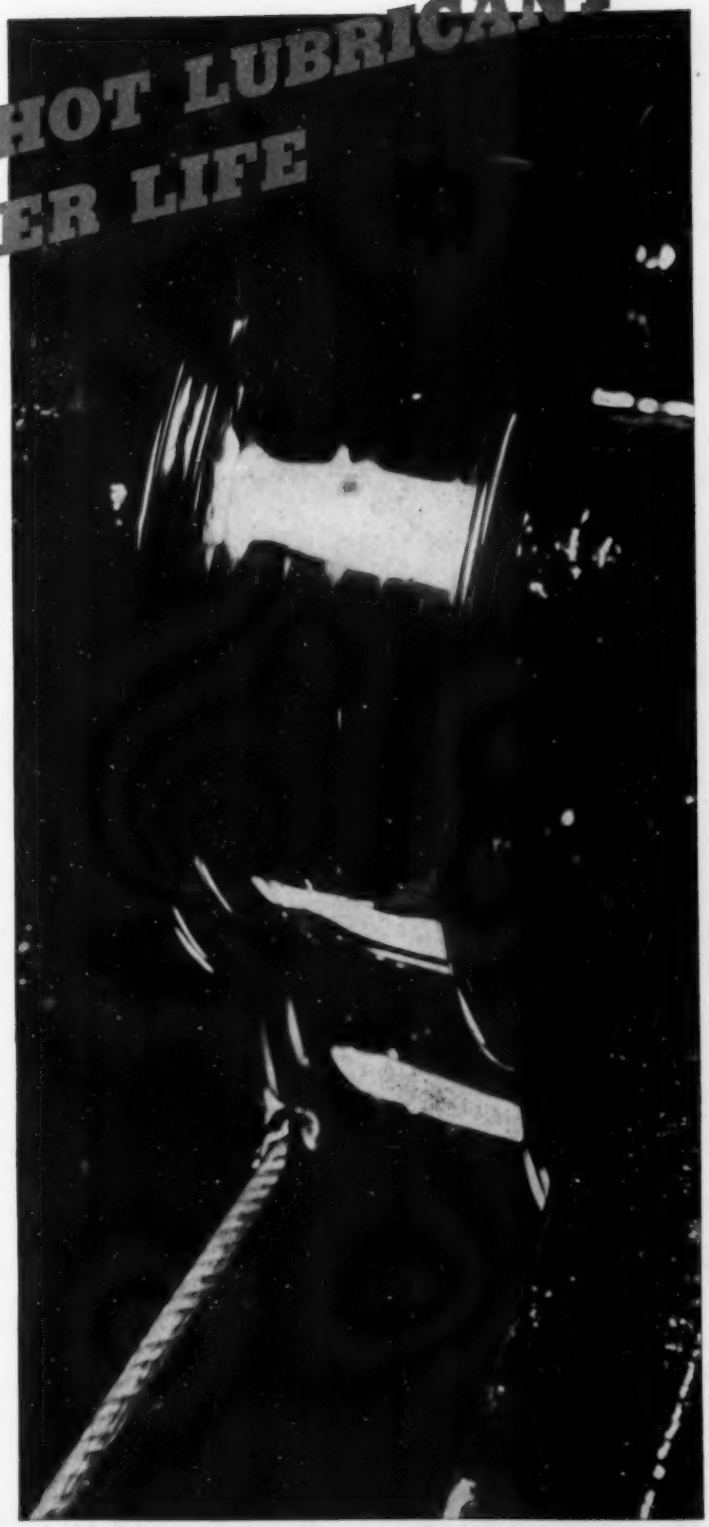
"Don't get caught short." Demands are heavy — plan your purchases now. Universal field engineers and sales-service representatives in most cities will make helpful recommendations.

UNIVERSAL CRUSHER COMPANY, 617 C Ave. West, Cedar Rapids, Iowa

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

DUNKED IN HOT LUBRICANT FOR LONGER LIFE



Purple Strand Wire Rope

This length of hemp rope is about to become the center of a piece of Bethlehem Purple Strand wire rope. Every fibre of this hemp rope has been impregnated with a compound that both lubricates and preserves.

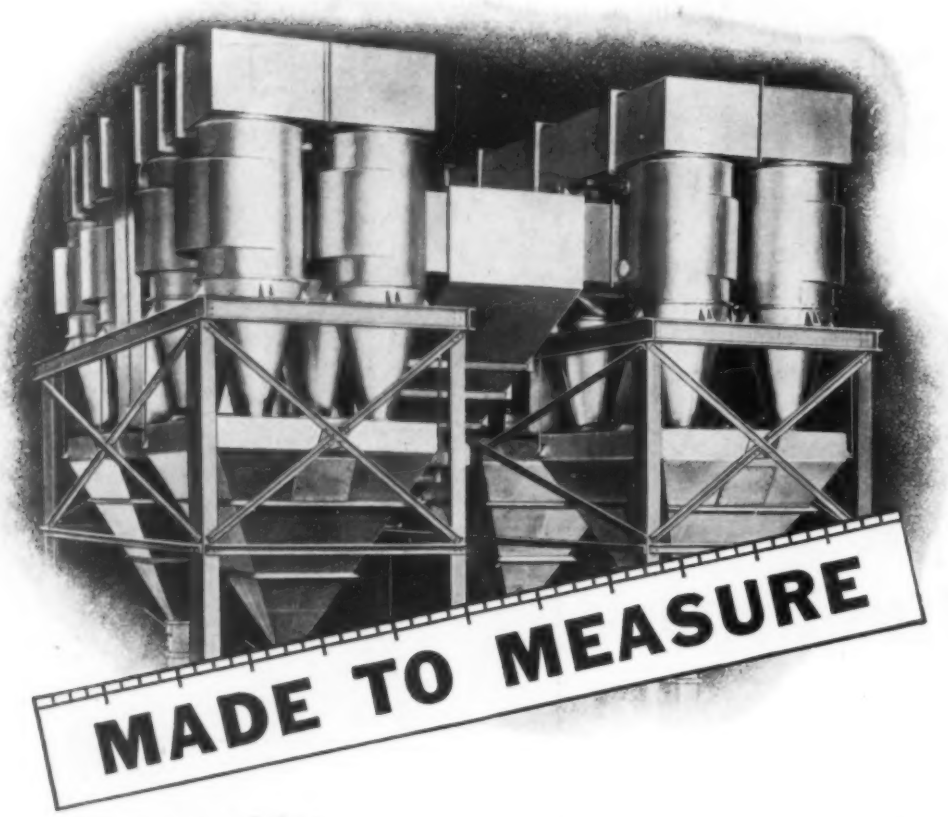
Now, as a further protection, the hemp core plunges into a vat of hot lubricant, emerges with a thick, smooth coating and is pulled, together with the strands, into the closing die. Here the strands close around it. The hot lubricant is squeezed uniformly into every nook and cranny, and the rope is ready for shipment.

When you consider that the strands in Bethlehem wire rope are themselves bathed with a lubricant which is basically matched to the core lubrication, you see how thoroughly Bethlehem handles this important problem.

Why not try Bethlehem Purple Strand on your own job? It's made of premium Improved Plow Steel, is manufactured on new machinery; its individual parts fit together with accurate precision. The performance record of this fine rope is its best salesman.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY



. . . *for* YOUR *dust collection problem*

BUELL does not carry dust collectors "in stock". Every Buell installation is "made to measure".

When you buy a Buell Dust Collector it is designed and built specifically for the job it is to do *in your plant.* The results you demand are studied and the equipment is designed to produce them. Space available for installation is also considered and the collector built accordingly.

Buell Dust Collectors—of any capacity for any type of dust—incorporate the advantages of the patented Van Tongeren System used exclusively in Buell equipment. Buell has the only cyclones with a dust pocket. Buell *guarantees in advance* the exact percentage of dust of each particle size that will be collected.

The facilities of the Buell Dust Testing Laboratory are at your disposal to help you find a "tailor made" solution to your dust collection problems.

A copy of our booklet

"DUST IN INDUSTRY"

will be sent upon request

buell
DUST COLLECTORS

SUITE 5000, 2 CEDAR STREET, NEW YORK

BUELL ENGINEERING COMPANY, INC.

Wherever located, you will be quickly served through sales offices of either BUELL ENGINEERING CO. or B. F. STURTEVANT CO.

A wide range of consistencies available for any method of application or operating condition.

YEARS of exhaustive research by Gulf's technologists have produced two superior lines of lubricating greases for ball and roller bearings — greases which provide a "second wind" for today's hard pressed equipment.

One, Gulf Anti-Friction Grease, is recommended for heavy duty service. The other, Gulf Precision Grease, is recommended for lighter duty and higher speeds. Both have a high melting point and are specially prepared for greatest resistance to oxidation and separation.

Gulf's newly developed method of compounding, employing special high pressure kettles and mixing methods, produces these greases with a relatively smooth, non-fibrous texture, which gives a true picture of their consistency.

Both of these superior new lubricants are available in a standardized consistency range in line with the National Lubricating Grease Institute consistency recommendations which went into effect March 1, 1941. Write today for complete information.

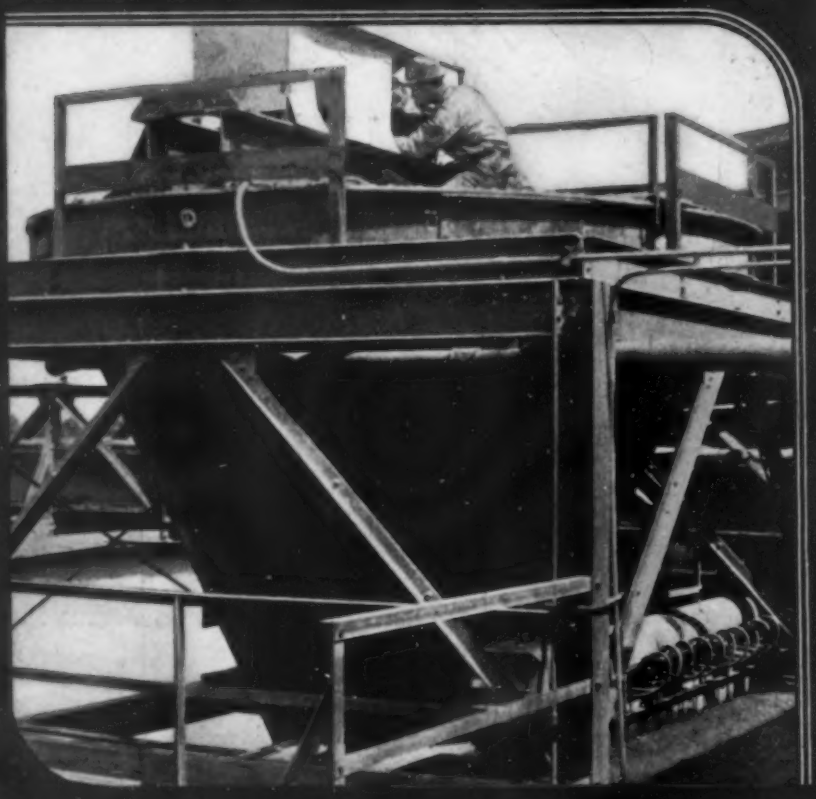
GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation - Gulf Refining Company RP
3800 Gulf Building, Pittsburgh, Pa.

Please send me without obligation complete information about your new long life greases for anti-friction bearings.

Name.....
Company.....
Address.....

FOR COOLING HOT CEMENT



FLS

Cement manufacturers are constantly confronted with the problem of cooling hot cement to temperatures acceptable to their customers when making bulk shipments or for immediate packing in paper bags. • The FLS Conical Cement Cooler has been especially developed for cooling hot cement to relatively low temperatures. • It consists of a water-cooled conical tank, provided with an agitating device and a specially designed feeder which insures uniformity without flushing. • Recommendations will be gladly submitted.

F. L. SMIDTH & CO.

Designers of Cement Making Factories, Manufacturers of Machinery for Making Cement and Lime, etc.

60 EAST 42nd STREET NEW YORK, N. Y.

Vacuum Control Speeds Pit Work!

Buckeye Clippers' 24 features give you rock bottom gravel digging costs and by far the lowest shovel operating and maintenance costs.

	Vacuum Control	Ind. Chain Crowd	175 F.P.M. Min. Hoist Speed	Tubular Dipper Stick	Shatter-Proof Glass	Max. Digging Radius 23' 2"	Max. Dump Height 17' 4"	Sixth Power Drum Brake	Min. 3.25 R.P.M. Swing	7.25 M.P.H. Top Travel Speed	Simultaneous Swing, Hoist, Travel	4 Anti-F. Bearings on Main Mtrs.	A-F. Bearings on Hoist Rollers	Min. 18" Crawler Treads	Max. 10'-3" Crawler Length	Above Work Space on Cab	Power Boom Hoist and Safety Brake	Fume Hardened Gears	Automatic Swing Brake	Over 12" Ground Clearance	Gear Universal Power Hoist Lib	Vacuum Power Trip	Over 5 H.P. Rating	Weight over 27,000 lbs.
CLIPPER MODEL 50	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shovel No. 4	No	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 5	No	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 6	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 7	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 8	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 9	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 10	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 11	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes
Shovel No. 12	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes

A flick of the handles and the Clipper has started to chew off a big bite while another shovel "would still be thinking about it."

Mevac (the original) vacuum power control, standard equipment on every Clipper, gives you faster, smoother swing, crowd and hoist. No long clumsy levers to shove and tug—just six small handles do the trick. Three handles control all actions through a complete work cycle.

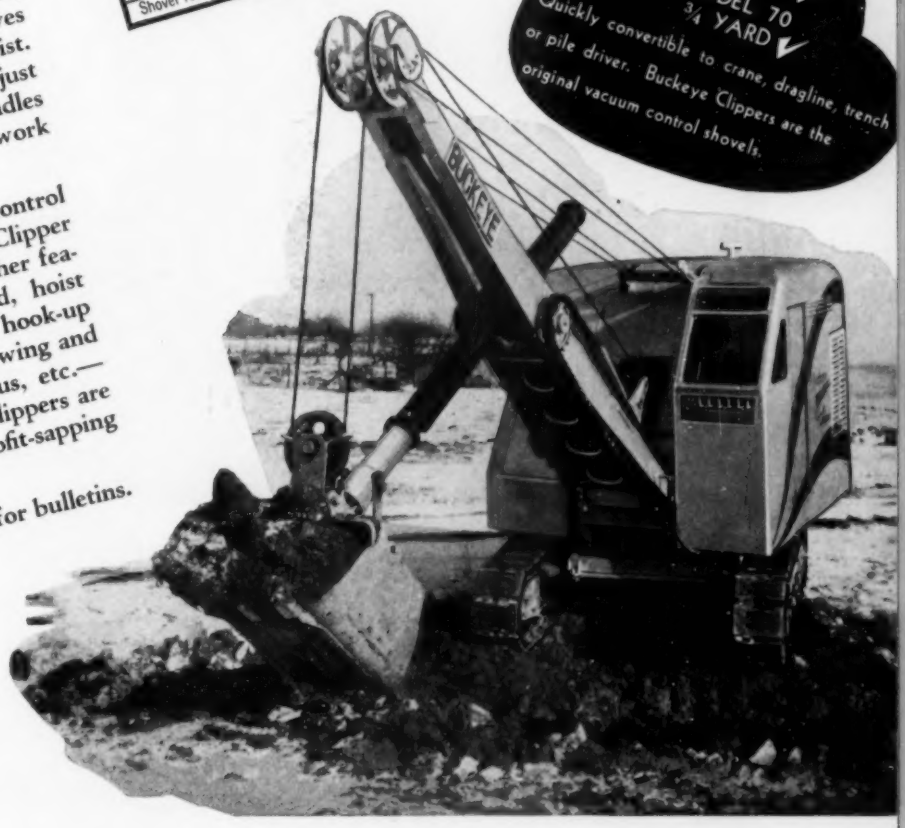
The savings provided by vacuum control would be reason enough to choose a Clipper for your pit. But also check its 23 other features—including simultaneous crowd, hoist and swing; universal joint power hook-up from engine to mainshaft; vacuum swing and drum brakes; greater digging radius, etc.—and you will see why small, fast Clippers are replacing larger, slow speed profit-sapping shovels.

Get the cost-cutting facts—send for bulletins.

BUCKEYE TRACTION
DITCHER CO.
Findlay, Ohio

MODEL 50 ½ YARD ✓
MODEL 60 ⅝ YARD ✓
MODEL 70 ¾ YARD ✓

Quickly convertible to crane, dragline, trench or pile driver. Buckeye Clippers are the original vacuum control shovels.



Built by Buckeye ✓

Convertible Shovels

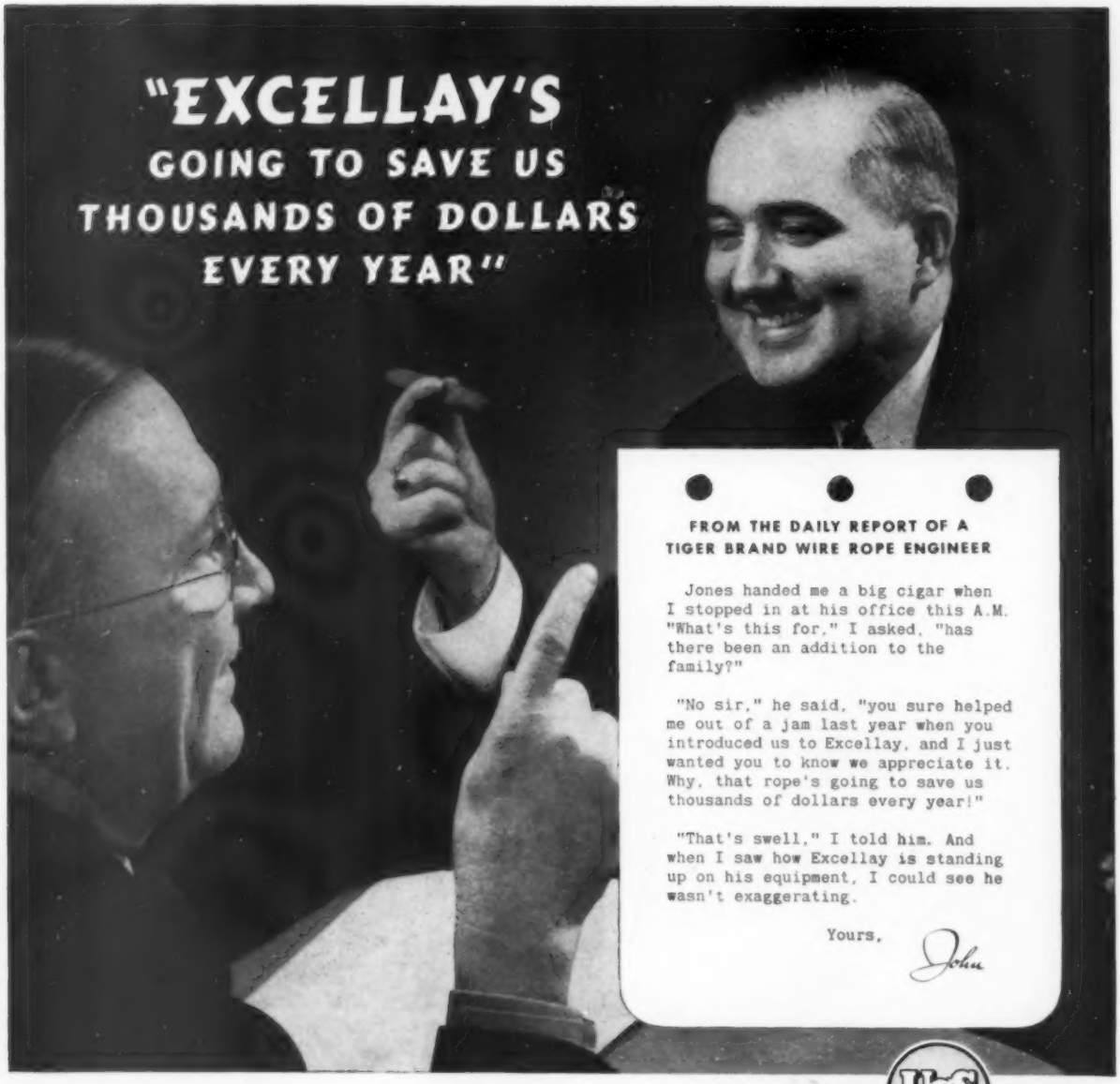
Trenchers

Tractor Equipment

R-B Finegraders

Road Wideners

Spreaders


"EXCELLAY'S
GOING TO SAVE US
THOUSANDS OF DOLLARS
EVERY YEAR"
FROM THE DAILY REPORT OF A
TIGER BRAND WIRE ROPE ENGINEER
Jones handed me a big cigar when I stopped in at his office this A.M. "What's this for," I asked, "has there been an addition to the family?"
"No sir," he said, "you sure helped me out of a jam last year when you introduced us to Excellay, and I just wanted you to know we appreciate it. Why, that rope's going to save us thousands of dollars every year!"
"That's swell," I told him. And when I saw how Excellay is standing up on his equipment, I could see he wasn't exaggerating.
Yours,
John

WHEREVER wire rope is used, you can be sure that not far away is one of the arms of the American Steel & Wire Company, the Tiger Brand Wire Rope Engineer.

What these men accomplish is no mystery to the thousands of wire rope users they contact every year. They know your problems, they talk your language. Their job is to help you select the best wire rope for a given task—to help you put wire rope to the most effective use—in short, to help you get a full dollar's worth of performance out of every dollar you invest in wire rope.

Get to know your American Tiger Brand Engineer better. He's in position to give you practical, down-to-earth, money-saving assistance. If for any reason you are not being contacted by one of these engineers, write or call us and you'll learn the true meaning of real wire rope service.

USS

EXCELLAY
Preformed
WIRE ROPE

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY
San Francisco

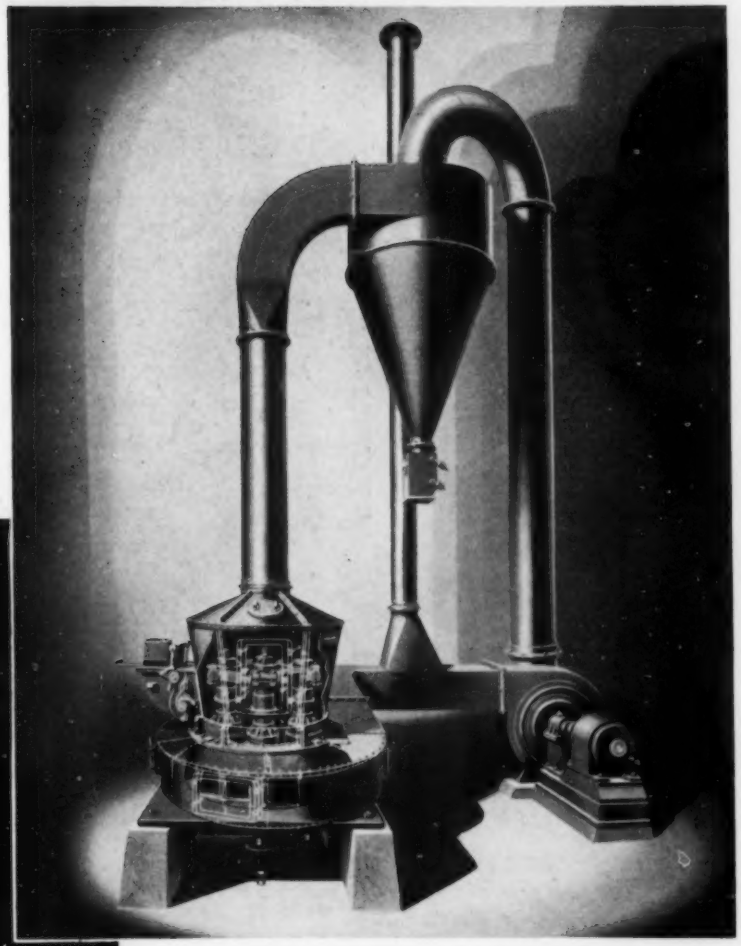
United States Steel Export Company, New York

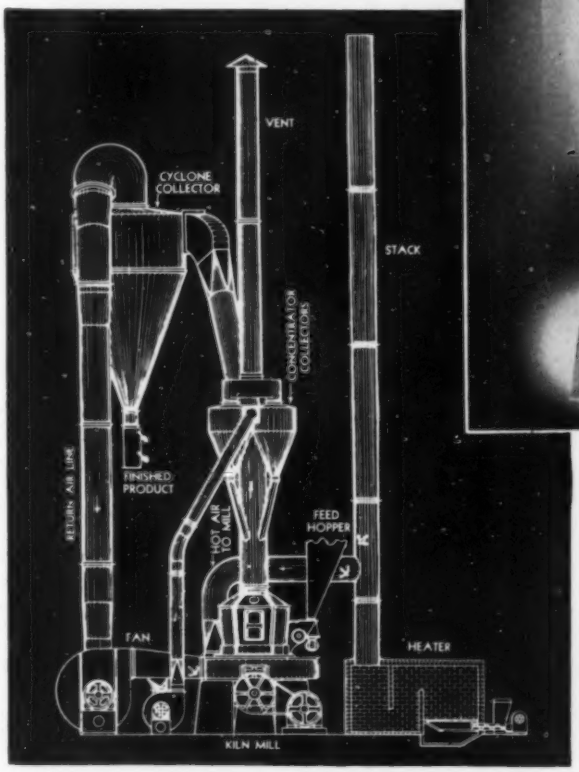
UNITED STATES STEEL

PRODUCTION ECONOMY in Commercial and Medium Fine Grinding

. . . is now available in greater measure with the latest type of Raymond LOW SIDE Roller Mill . . . the reliable standby of the non-metallic minerals industry for more than a generation.

It gives higher tonnages per horsepower than ever before. It shows new low costs in pulverizing materials to average commercial fineness, ranging from 60% to 95% through 100-mesh.





Flow sheet showing Low Side Roller Mill equipped with air-drying system for removing small percentages of moisture in grinding gypsum, limestone, etc.

Automatic Feeder, governed by pneumatic feed control, maintains a maximum "load" on the mill under all conditions.

Oil Journals with automatic lubrication, and high grade bearings, assure record low friction losses and minimum power consumption.

Improved Fan Arrangement on return air line practically eliminates abrasive wear.

Spider Vanes, revolving at top of main shaft in the separating chamber, give improved classification and better fineness control.

You can't match the economy of the Raymond Roller Mill—High Side for extreme fine grinding, and Low Side for medium grinding—for pulverizing agricultural limestone, dolomite, phosphate rock, gypsum, clay, bentonite, barytes, bauxite and similar materials.

Ask for Catalog No. 34

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1307 North Branch Street CHICAGO
Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

Why Buy SLY?

• Sly Dust Filter in the packhouse of a cement plant. Rotary valves on the dust hoppers and a screw conveyor return the collected dust automatically.

5 EXCLUSIVE FEATURES WHICH MAKE SLY DUST CONTROL A 4 TO 1 FAVORITE IN THE CEMENT INDUSTRY

1 MORE FILTERING CLOTH. For any specified amount of money or in any specified amount of space Sly gives you many more square feet of effective filter cloth area—greater filtering capacity per cubic foot of space.

2 TAUT BAGS (Patented). Sly horizontal cloth filter bags are always held *taut*—a patented feature. This insures: (1) a constant *minimum* resistance to the air, and (2) removal of dust more quickly and more thoroughly since the *entire* bag is vibrated *uniformly* during the shaking period.

3 SIMPLER SHAKER MECHANISM. Consisting of many less moving parts, the Sly shaker mechanism is far simpler, resulting in less maintenance and lower costs.

4 AUTOMATIC CONTROL. Sly gives you *any degree of automatic control* up to *complete* automatic; minimizing or even removing entirely the human factor, thereby achieving most economical operation and maintenance.

5 BAGS MORE EASILY REPLACED. Although Sly filter bags last a long time, when the bags do need replacing any individual worn bag can be readily located and easily replaced without disturbing the others—an exclusive Sly feature.

• In brief, Sly Dust Filters are so constructed throughout that they save on space, on power and on maintenance. That these advantages are widely appreciated in the cement industry is evident from the fact that Sly is a 4 to 1 favorite. If you have a dust problem—in the cement industry or rock products field—our engineers will help you solve it. Ask for Bulletin 98.

THE W. W. SLY MANUFACTURING CO.• 4746 Train Ave., Cleveland, O.

BRANCH OFFICES IN PRINCIPAL CITIES

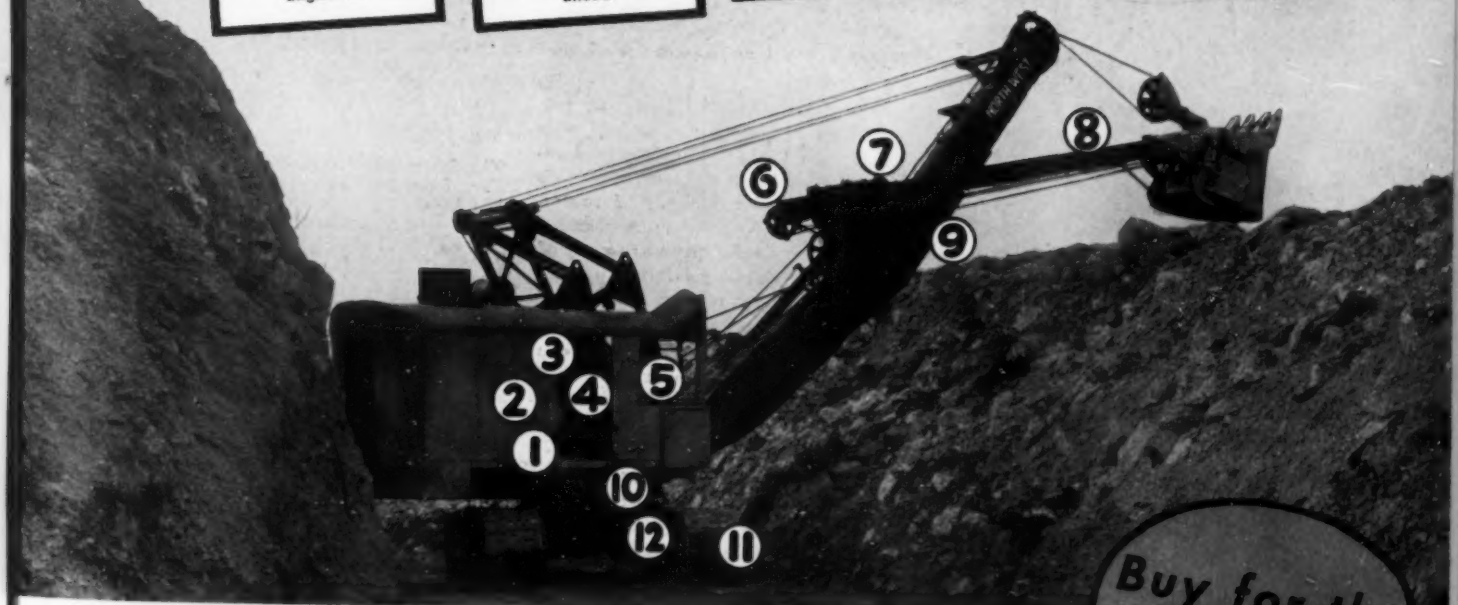
SLY

INDUSTRIAL DUST CONTROL

Count 'em-13 Reasons

why your next shovel should be a NORTHWEST

1. The Helical Gear Drive mounted on ball or roller bearings fully enclosed and running in oil — quiet, smooth, trouble free!
2. Uniform Pressure Swing Clutches. Large and ventilated with double cone shaped block frictions, no jerks, no grabs — far superior to a band type clutch which can not possibly be uniform in pressure.
3. Ball or Roller Bearings on all High Speed Shafts.
4. The "feather touch" Clutch Control in the main drum clutches — easy operation without complications. No piping, nothing to refill — not affected by weather.
5. The Cushion Clutch reduces the overloads on all parts under power when shock loads are encountered. It reduces wear and tear and lengthens cable life.
6. Dipper sticks are tied together by a cap casting and work as a unit.
7. Dual Independent Crowd utilizes force other shovels waste (Ask for "Digging Power Plus")
8. Long reach and positive independent control of the dipper.
9. The Northwest Welded Boom (hundreds in service and no Northwest Welded Boom has ever failed)
10. Cast Steel Bases give a rigid foundation that maintains shaft alignment
11. Differential Steering — positive traction on both crawlers while turning as well as when going straight ahead.
12. Travel gears fully enclosed and running in oil.
13. And many other features that mean high output and low maintenance.



NORTHWEST ENGINEERING COMPANY
1820 Steger Building · 28 East Jackson Boulevard · Chicago, Illinois

NORTHWEST

SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

Buy for the tough jobs and the easy jobs take care of themselves

IN QUARRY HAULAGE:

What you don't know ~~won't~~ will hurt you

Above: EASTON TR-15H Semi-Trailer. Average payload 22-25 tons. Hydraulic body hoist optional. Two other sizes.

You're risking big money when you don't know where the pennies go...

You may not be considering the immediate purchase of new equipment. Even so, it pays to *know* costs. An EASTON Quarry Transportation Survey will cost you nothing, will give you down-to-the-penny facts on cost-per-ton, based on recommended new equipment.

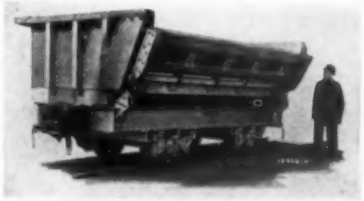
An EASTON SURVEY *gets all the facts!*

The EASTON Survey provides you with an accurately scaled map of your quarry, including haulage routes, location of shovels, crusher, etc. With this map is a tabular analysis of routes, equipment and capacity; a detailed time-and-cost study; and a summary of investments and depreciating periods based upon the most practical type of equipment for your service.

Like most manufacturers we are working against an abnormal backlog. *Our sales engineers have more time to give to survey.* It is an opportunity for you!

A letter from you, now, will help us plan spring field trips to include your quarry. This service incurs no obligation on your part. Write today . . .

The famous EASTON Phoenix Quarry Car. Doorless. 2-way dump. Timken bearings.



Above: EASTON Won Way Car. Below: EASTON Cornwall Car. Both have automatic down-folding door, Timken bearings.

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

EASTON

TWENTY-FIVE YEARS OF SERVICE TO THE QUARRY INDUSTRY

Rock Products

309 WEST JACKSON BOULEVARD

CHICAGO, ILL.

April 1, 1941

Dear Subscriber:

Louisville, Ky.: Gosh, is this town humming! Couldn't get a room until 7:00 P. M., and at an inflated rate, at that. Here I am, the following morning, writing on a typical farmer's kitchen table in a supposedly first-class hotel. They say the du Pont payroll on the powder plant at Charlestown is a million a week; that $200,000,000 will be spent this year in this area alone.

Mexico City: The cement business continues good down here. Three companies have more or less decided to increase plant capacities up to 40 percent. We are looking forward to six years of prosperity down here. After some six years of being pushed around, we are naturally very much elated over the prospect of a little peace from domestic strife.

Bishop, Calif.: The possibilities of froth flotation in the non-metallic mineral industries have only been scratched. I can see where any low grade product can be raised in quality or purity by flotation, and I don't care what the material is. You can, theoretically at least, separate bird seed from horse manure, or ink from news print. I am going to specialize in flotation in the rock products industries.

Washington, D. C.: The new electron microscope developed by the Radio Corporation of America makes possible photographs or lantern slides magnified from 50,000 to 500,000 times. We saw a slide of "amorphous" hydrated lime, in which you could identify and count 15 or 16 different shapes of crystals. With this new instrument we are going to learn things about fine powders.

Spokane, Wash.: A good example of cooperation and specialization. The Central Pre-Mix Concrete Co. has purchased the ready-mixed concrete business from the Frese Sand, Gravel and Ready-Mixed Concrete Co., and sold to the Frese Company its own concrete block business. The Central Pre-Mix Concrete Co. is one of the livest wires in the ready-mixed concrete game; and Mr. Frese, of the Frese Company, is the owner of the Spokane Loc-Block Co., and has specialized in the products business.

San Jose, Calif.: Permanente Cement Corp., is said to use 12,000,000 cu. ft. of natural gas per day of 24 hours; and expects to use a lot more when the new metallic magnesium plant gets into production. The company also buys its electric power requirements. Said to be working on a special deal with Pacific Gas & Electric Co.

Chicago, Ill.: We know of a portland cement company which earned a net profit in 1940 of almost 10 percent on total sales volume; and pays all employes dividends proportionate to their annual earnings, dollar for dollar, as for shareholders' investment. This company has never had any "labor troubles."

Allentown, Pa.: The decision of Universal-Atlas Cement Co. to go ahead on the Northampton, Penn., plant is of great significance. The plans for rebuilding have been in cold storage for a long time, as every one in the cement industry knows. Evidently the directors of the U. S. Steel Corporation still have faith in the future of the construction industry.

Chicago, Ill.: Just finished going through our news source material and find the spring crop of projected new plants the biggest in many years. Portland cement shipments in February were 52 percent ahead of the same month last year.

New York City: We learn one of the big chemical companies is thinking of the future, "after the end of the war," in terms of getting business from the building construction industry. Evidently they are thinking of new markets for plastics. It is no secret that President Roosevelt is planning all kinds of construction to help us over the godawful jolt when war business ends. Rock products manufacturers, on your toes!

Chicago, Ill.: A good example of industry service. U. S. Army engineers and civilian engineering employes attended a two-day short course on soil-cement testing and construction at Savanah, Ga., early in March. The course was conducted by E. J. Felt, of the soil-cement bureau of the Portland Cement Association. In any industry, the producers, collectively if not individually, should know more about their product and its uses than any one else. Only thus can the industry render genuine public service.

Washington, D. C.: The Office of Production Management says some 50 percent of the nation's machine tools are idle or working less than 8 hours a day. Some of these are in the repair shops of plants in the rock products industry. Why not see if they can be used for defense? Big government contractors are being urged to sublet as much of their work as possible. A subcontract for your repair shop might give additional night employment to local mechanics now idle and save them from emigrating.

Chicago, Ill.: During the depth of the depression many rock products producers and manufacturers set aside unused reserve land containing stone or gravel deposits for use as vegetable gardens by their employees. This year might be a good one to return to the practice. Living costs are going up and this will help keep them down.

Santiago, Chile.: Cement is so scarce that a rationing system has been imposed. Important public work, including reconstruction necessary as a result of the 1939 earthquake, may have to be suspended.

Washington, D. C.: While the snow flies and we work, sites have been selected and work will start immediately on seven recreation areas in the Gulf coast region, which will be available for soldiers on leave from nearby camps, the War Department announced February 27. Facilities will be available initially for 500 men in each camp, but they probably will be enlarged later to accommodate from 2,500 to 7,500 men. Bathing beaches were regarded as essential in the selection of each area, while other recreation facilities such as golf courses, tennis courts, dancing facilities, open-air movies, and deep-sea fishing will be provided in most cases, (and that is from an official U. S. government bulletin).

The Staff

THERE'S *Money* IN EVERY DIPPERFUL!!

The "first line of defense" for any rock quarry, stone or sand pit, large or small, is its power shovel, dragline or clamshell equipment. It must be capable of defending contract prices with low cost yardage, and to keep raw material prices at a minimum where this equipment has a processing plant to feed. MARION shovels, draglines and clamshells in rock quarry, stone and sand handling service have a national reputation for "delivering the goods" in profitable doses. Defend your financial interests with a MARION. Only in this way can you fully appreciate what we mean when we say, "There's money in every dipperful when a MARION is on the job." Write for bulletin describing the size and capacity of machine you feel you need. THE MARION STEAM SHOVEL COMPANY, Marion, Ohio, U. S. A.

MARION

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FROM ¾ CUBIC YARD TO 35 CUBIC YARDS • *Gasoline • Diesel • Electric*

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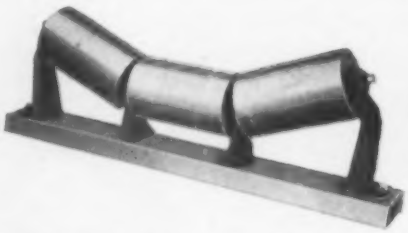
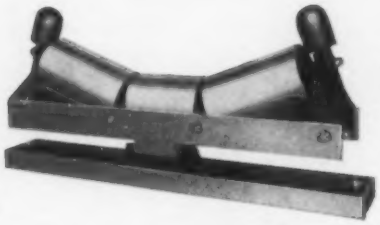
Keep it *Keep it* *Keep it*

GOING...STRAIGHT...CLEAN





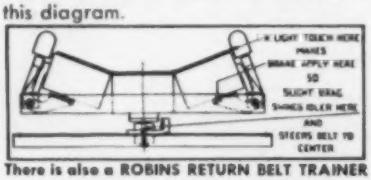
WHEN?—all the time there's work to do. Because you want to get your share of increasing 1941 business. **ROBINS ANTI-FRICTION TROUGHING AND RETURN IDLERS** are designed and constructed to outlast other idlers. They are widely known for the following high-grade features:

1. Rigid truss construction.
2. Complete identical pulley assemblies, interchangeable and reversible.
3. Improved "Single-Shot" lubrication.
4. "Triple Seal" that keeps grease in and dirt out.

You get maximum service and minimum maintenance with

WHY?—because belting is the most expensive item in a conveyor installation and its premature destruction is a serious, inexcusable waste.

ROBINS BELT TRAINERS are not "guide idlers." A belt controlled by **ROBINS** Trainers is aligned *without wear;* not by pressure on the edges but by rolling contact with the entire surface of the belt. Notice the way it works in this diagram.



There is also a ROBINS RETURN BELT TRAINER

HOW?—with ROBINS RUBBERDISC RETURN IDLERS. The rubber discs of these idlers are made of a soft abrasion-resisting rubber which slightly flattens at the points of contact with the belt. These deformations afford a constant automatic cleaning action for both discs and belt. Result—no accumulation of sticky abrasive or corrosive substance on the belt which means longer belt life and less maintenance. This Idler is equipped with ball bearings completely sealed and lubricated for life. No greasing or oiling is required.

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ALL-OUT WAR PREPARATION – AND AFTER

NOT MANY comprehend what "all-out" war preparation (or actual undeclared war) means to us as individuals. One thing is clear. We are going to destroy inestimable wealth—exhaustible resources, and things representing billions of man-hours of labor. Those resources of coal, iron, petroleum and countless other things can never be replaced. In exchange for war goods we will have billions of pieces of paper called money, which we can exchange for things we want as long as these things are available and the paper is acceptable.

Not all the billions spent and to be spent represent total loss. There will be industrial plants, highways, bridges, power plants and structures that represent continued usable or potential wealth. It is this outlet that producers in the rock products industry are supplying. Until an immense amount of new construction is completed there will be need for these producers, for their plants and for work by their employes.

To supply new construction needs efficiently and economically rock products operators want to install much new equipment. Are they able to get it? For a year probably there will not be a great deal of difficulty because many machinery manufacturers have been foresighted. Eventually, if the war lasts, there will be increasing difficulty. Money will be more plentiful than ever, but vital material things will be scarce and hard to get. Already, nickel, zinc, aluminum, ball and roller bearings and other essentials are being restricted to war industries.

Suppose you have a subcontract for an essential war construction job. Can you get a priority order for a piece of equipment? Nearly *all* construction work will be found to tie in more or less directly with war preparation needs. Obviously, the line will have to be drawn somewhere. If the contractor—say one of the big powder companies—believes your needed piece of equipment is essential for him to complete his contract, probably you, a subcontractor for materials, may get the machinery at the contractor's request.

However, the case of the building materials producer is obviously different from that of the manufacturer of powder or shells, for example. The building materials producer probably *can* operate without the new piece of equipment; not economically or efficiently, but he can operate. If it is a case of not being able to get out the volume within the time limit, possibly the priority order might be withheld if it is determined that some other local producer can supply the deficiency. Thus there is opportunity for patriotic coöperation.

On the other hand, possibly the best investment, or the best use a producer or manufacturer can make of the paper cash that will be so plentiful, is to improve and rehabilitate his permanent operations. His plans to do this should be long-range, insofar as possible. The immediate demand is for industrial, military and naval construction. The ultimate market must be highways, public works and utilities. The President has already placed before Congress a very hazy, six billion dollar public works construction program to be undertaken as a post-war activity.

We are not among those who believe there must necessarily be a terrible post-war slump. This country has probably two-thirds of all the liquid capital (gold) in the world. It has resources to make capital goods for peace-time uses as well as for war. It has technical brains to design and manage peace-time enterprises. If and when world conditions encourage peace-time developments, this country can and should take the lead in developing peace-time enterprises the world-over.

We ought not again do as we did after the 1914-1918 world war; loan merely credit to buy American goods. We should follow up those American goods with American management of the enterprises they are designed to serve. This does not mean to "exploit" the people of other lands. It means that we are prepared to render unsurpassed financial, business and technical services for a fair return.

For example there undoubtedly will be a strenuous highway building era in Central and South America, one such as took place in the United States in the 1920-30 decade. Our country has already contributed several million dollars to Central American countries to help this program start. Undoubtedly this is a good investment even though not one cent is ever recovered directly. We vision the time when tourists from the United States will pour South in great numbers.

No vivid imagination is required to picture the business that would result both to our Central and South American neighbors and to ourselves, when the day comes that we may drive over paved roads from Bangor, Me., or Seattle, Wash., to Buenos Aires, Argentina, with side-trips through the Amazon jungles and the Andes Mountains. We are going to help furnish the impetus, the capital, the technical skill and help in manufacturing the needed materials and equipment—and we can do it there as well as here.

Nathan C. Rockwood

NEWS AND COMMENT

Keep Prices Down!

DISCUSSING HOME-BUILDING prospects with his stockholders, Lewis H. Brown, president of Johns-Manville Corp., said: "Barring establishment of priorities affecting building materials,

volume for the full year should be substantially ahead of 1940."

Mr. Brown warned his stockholders that a swift rise in building costs could bring about a collapse in residential construction volume, pointing to 1916 as an example of the disastrous result of skyrocketing prices.

However, he doubted the possibility of a dangerous upswing in prices. There will be some increases, he predicted, necessitated by rising basic costs. But leaders in the building industry are doing everything in their power to resist inflationary trends. These efforts, he said, coupled with "increasing pressure from the Government" make it appear that the level of building costs will be kept attractive to potential home owners.

Some Good Advice

TRY AND REMEMBER THIS—That in the abstract the employer is really only the agent who sells the labor of his workers. His responsibility to his workers consists in providing properties, plants and equipment equal to the need of the enterprise, to supply them with steady work, under sanitary conditions and at the best possible wages. But to provide continuous work and high wages, it is necessary to intensify production by equipping with better and more powerful tools, aiding labor by increasing the application of mechanical handling and finding methods for eliminating lost motion and waste. Above all, it is incumbent on the employer to build up, among his workers, such a spirit of confidence and coöperation that they will become important factors in that complex and highly effective organization which large scale industry requires.

How to win that confidence and cooperation, how to build up that team spirit that spells success, is one of the problems for which no specific solution has yet been found. Sometimes it is developed through the personality of the owner, his fairness, his considerate attitude toward his men, his qualities of leadership.

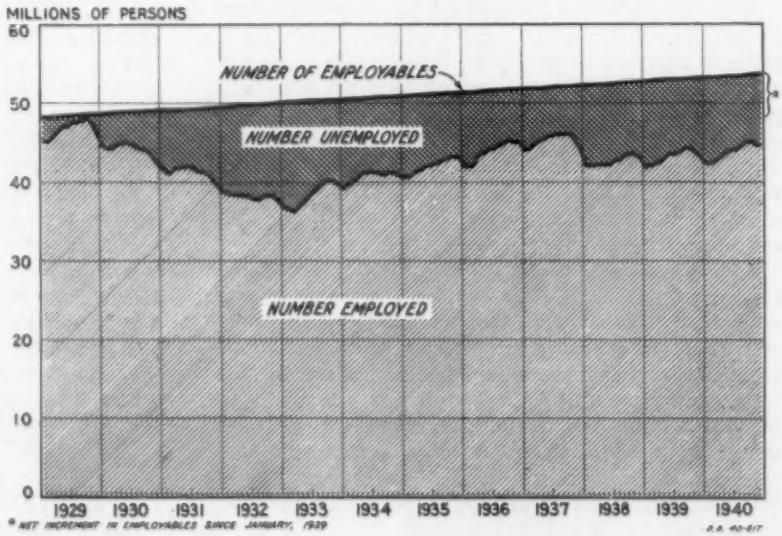
In the larger organization it can be developed through broad and liberal policies on the part of the company, supplemented by the ability of specialists at the head of well-organized personnel departments.

In the smaller industries where close contact can be maintained by the employer, or by him through his superintendents and foremen, more satisfactory results can be obtained through less complex machinery.

Alfred Kauffmann, president of Link-Belt Co., Chicago, spoke thus, in a commencement address to mechanical engineering graduates of Illinois Institute of Technology, January 29, 1941.

Unsolved Problem

ACCOMPANYING CHART is mute evidence of the great unsolved problem of the New Deal administration. Up to the end of 1940 even the war industries had not absorbed enough of the unemployed to lower the total to that of midsummer 1936. The "increment of employables" is emphasized, which is of course merely the increase in population (of employables); that is something we never even knew about prior to 1933 under our old-fashioned economics. The chart is reproduced from *Domestic Commerce*, official U. S. Department of Commerce publication.



Ratio of employed and unemployed to total employable from 1929 through 1940

For National Gypsum Co. Stockholders

A FINE EXAMPLE of informative and promotional stockholder reports is one recently received from the National Gypsum Co., Buffalo, N. Y. In addition to the regular annual financial statement there is a 10¾x-13½ in. brochure of 20 pp. with pictures and descriptions of the various plants and operations of the company. The title of the brochure is "An Idea That Was Too Big for One Factory." Included are portraits and thumb-nail sketches of the members of the sales organization.

Such a job as this undoubtedly adds prestige to the company and its products, first with the owners—the stockholders—and with the public of which they are a part. It probably also is an excellent piece of promotional literature for the sale of the company's products; and last but not least, it must have an effect in promoting morale of employes.

In his annual report Melvin H. Baker, president, said in part: "Labor and material costs increased during 1940. Since it was not possible to make a comparable advance in prices, profit margins were less. This situation was partly met by greater volume, more efficient production and economies from additional equipment."

The most startling increase in costs was in taxes, which rose 52 percent over those of 1939, amounting to 66 cents per share of stock.

Excerpts from the annual report say:

In 1940 the company used $2,381,164 for additions and improvements to its eighteen mills. Part of this money was used to complete the company's new board mill and rock storage in New York City. This project was begun and partially paid for in 1939. Completion of the New York plant rounded out the company's program for distribution of gypsum products into all markets east of the Rockies.

The paper mill recently purchased at Newburgh, N. Y., will give the company's Atlantic seaboard mills a continuous supply of low-cost, high-quality paper essential to the manufacture of board.

At the close of the year, National Gypsum Co. assumed control, under long-term lease, of certain lime properties previously owned by the Chemical Lime Co., Bellefonte, Penn. The Reconstruction Finance Corporation, the lessor, has agreed to spend $350,000 for substantial plant improvements as directed by National. Under terms of the lease, the company may purchase the property on favorable terms at any time during life of the lease. This property includes large deposits of excellent quality limestone.

During the past four years the company has been selling rock wool purchased from outside manufacturers. To support this rapidly growing market, negotiations have just been completed for the purchase of General Insulating and Manufacturing Co., makers of rock wool. Their product is well known in the building field. Sales last year amounted to approximately $1,200,000. The assets include plants located in Alexandria, Ind.; Dubuque, Iowa; and Dover, N. J., as well as deposits, patents, inventories, accounts and good will.

Demands on production increased during the fall months until most plant capacities were fully utilized. Plaster and metal lath facilities were the major exceptions and they were running at 60 percent of capacity. Fortunately, the New York City board mill was completed in time to relieve demands on the Atlantic seaboard. Improvements and extensions now in process at other mills are expected to materially increase speed and quantity of output without sacrifice of quality.

In addition to these acquisitions, the company will benefit from several product improvements developed in its own laboratory last year. These include a new process for making a light-weight wallboard, a new kind of sound control tile and a new processed type of paper. These developments combined with a more complete line in rock wool and lime will increase prospects for greater volume.

The company also developed new uses for present products—particularly to meet building requirements of the National Defense program. For example, gypsum sheathing, wallboard and insulation are used widely in the construction of barracks. There was also developed an ingenious acoustical assembly for controlling the high noise volume in airplane motor testing chambers.

Although sales for defense construction were only about 5 percent of the company's total in 1940, these developments are important because many can be applied in private building.

The company's principal market—home building—was responsible for the larger part of sales increase. As this report is written, home construction is increasing at a rapid rate. This is reflected in current sales now running 40 percent ahead of last year.

Gold in That "Thar" Sand Pit

SENT IN by a traveling editor from an unidentified local newspaper is this: "About two weeks ago a pot of gold was found but not at the end of the rainbow. It was found on the property of the Colleton Sand and Silica Co. about two miles from Yemassee, South Carolina.

"This company is owned and operated by J. S. Jones, Jr., Charleston. There were about six negroes digging away in the sand, when suddenly one found a silver dollar, the rest of them became so elated and hoped they too would be that lucky—and what seemed almost unbelievable before their very eyes the rest of the treasure was revealed.

"It had been buried in a jar and a few feet away the jar was found broken. After a scramble and thorough combing of the sand the total sum found was $79.40; one ten and two five dollar gold pieces, forty-two silver dollars, an old English penny and the rest in quarters and dimes. The earliest date found was 1876 and the latest 1911. Mr. Jones gave his men dollar for dollar for the money just as they found it.

"The murder of an old negro who lived not more than 300 feet from the spot where the money was found was recalled. He was killed about twenty-five years ago, so it is believed that this money was buried by him."

Worst of All Big Business!

NO WONDER business men sometimes get a bit discouraged. Bureaucrats and politicians who are constantly telling them how to run all private business, run the public business as described in the *Wall Street Journal*, thusly:

"Our Congress goes into session with no plans as to what amount it will appropriate. Government departments through the Budget Bureau submit estimates of their needs. These add up to a sum which we call a budget. It is nothing of the sort. Departments have second thoughts and come forward with more demands. If a Congressional bloc—witness the present operations of the farm Congressmen—can muster enough strength it can completely upset the estimates by many millions.

"That is disorder enough, but it is not the full story. After a session of Congress has adjourned, there are not 1,000 people in this country, including the five hundred-odd members of Congress, who know how much has been appropriated.

"The least demand which the taxpayer ought to make is to know how much is being spent and for what. The machinery for giving him that information and dramatizing it for him is a simple performance.

"Let the executive departments submit their estimates and proposals as they do now.

"Let the House of Representatives and then the Senate debate those proposals, not piecemeal as now, but as a whole. At the end of that debate, let us have a vote on how much money the government is to spend in any given fiscal year.

"Let us have safeguards to see that no greedy group can casually make additions to that amount. Make it mandatory that any Congressman who proposes an expenditure in addition to the sum set by the whole of Congress, shall at the same time propose a tax to cover the extra expenditure.

"Under such a system it would be possible to relate expenditures to revenue. We would know what we propose to spend in any given year. We would know how much we were to pay in taxes toward meeting that expenditure. By such amount as expenditure exceeded revenue, we would know that the Treasury must borrow."

Hints and Helps

★ FOR SUPERINTENDENTS ★

Transfer Hopper for Ready-Mixed Concrete

EAU CLAIRE SAND AND GRAVEL CO., Eau Claire, Wis., has built the trailer-hopper device illustrated for handling ready-mixed concrete on jobs where

Combination ramp and portable hopper for transferring ready mixed concrete from trucks to wheelbarrows

standby time would be undesirable for the mixer trucks.

The transfer hopper and run-way for transit-mix trucks is hauled to the job and set up, the mixer trucks backing up the run-way to fill the hopper. The hopper has enough height to permit loading wheelbarrows direct.

Doubling the Life of a Conveyor Belt

By W. F. SCHAPHORST

THE ACCOMPANYING SKETCH shows how conveyor belts commonly wear—on one side. Most of the wear frequently occurs during the process of loading, and when the material is loaded on one side that is where the belt wears, as shown in the sketch.

To double the life of one of these belts simply turn it through 180 deg.

Sketch showing how conveyor belt wears on the loaded side and may be turned to double its life

That is, using a common expression, turn it "end for end." The material being loaded will then strike and wear the unworn or "good" side and the belt need not be discarded until that side is worn out.

Bearing the above in mind it is obvious that there is an advantage in *not* loading a belt in its center because turning such a belt through 180 deg. will do no good. A center-loaded belt will last only about one-half as long as a belt that is first loaded on one side and then on the other.

Speed Up Quarry Haulage

QUARRY OPERATIONS at the Speed, Ind., plant of Louisville Cement Corp., have been speeded up considerably by the use of auxiliary shovel equipment.

The quarry is about 1½ miles from the mill, and stone is hauled in quarry cars over narrow gauge track by locomotives. A 4-cu. yd. Bucyrus electric shovel loads the blasted rock into the cars. To maintain a clean quarry floor in following up the big shovel, this company uses a Traxcavator mounted on a Caterpillar Diesel D-4 tractor. The ¾-cu. yd. Traxcavator bucket can be maneuvered very easily in doing a thorough job of cleaning up the quarry floor, picking up all the smaller rock which may be left by the big shovel and dumping its load into the waiting quarry cars. It is fast in operation, and can be literally "turned on a dime." Two of these auxiliary shovel units are used at the Speed, Ind., cement plants, and two more units are in operation at the Milltown, Ind., lime plant. All four units were from the Roy C. Whayne Supply Co., Louisville, Ky., agents for the Trackson Co., Milwaukee, Wis.

Cleaning up operations in the quarry represent only one of many uses found for the Traxcavator. When track is to be shifted in the quarry, it is a simple matter to wrap a chain around the rails of a section of track, hook it into the shovel of the Traxcavator, and in a few minutes the track is shifted to the new location.

This unit also is used to clean up before drilling blast holes, to level yards with a bulldozer attachment, to excavate for foundations, and to load trucks with rock from a stockpile when a hopper may not be available. Ties, rails, and other materials also are transported to various locations about the plant, yards, and quarry. Quarry cars and locomotives which jump the track may be quickly replaced on the rails with the aid of the Traxcavator, using a cable or the cable on Hyster attachment.

In hauling work, the D-4 Caterpillar tractor is equipped at the rear with a Hyster drum hoist driven direct from the main drive gears. When it is desired to move any heavy equipment, the hoist provides a handy means of doing the job. It is a BW4284 model with Timken bearings.

At the Milltown lime plant, the two Traxcavator units are used to load trucks at the quarry and also are available for the same maintenance and repair work which is carried on with these units at the Speed plant.

Operating costs are relatively low. A 25-gal. tank of Diesel oil fuel on each D-4 Caterpillar-Traxcavator will operate the unit three 8-hr. day shifts without refilling. With the new filter, the unit will operate 120 hr. without changing oil.

Using auxiliary shovel equipment to excavate foundation for retaining wall of crusher room. Inset, above: Same type unit equipped with drum hoist at rear to replace quarry cars or locomotives which jump the track

Checking Diesel Injection System

By ORVILLE ADAMS

MAXIMUM EFFICIENCY and economy of the Diesel engine can only be realized if the necessary attention is given to the problems associated with the fuel injection system.

It should be kept in mind that the fuel pump itself has three separate functions, namely, to build up the necessary pressure on the fuel at the injection nozzle for effective delivery, to control the quantity of fuel injected per stroke of the fuel pump, and to vary the timing of the injection period by actuation by the governor.

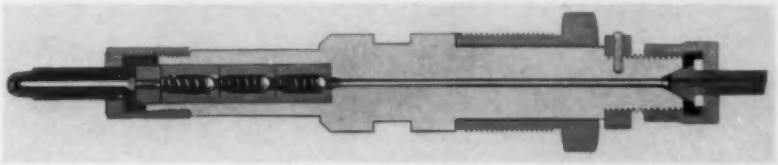
When the injection nozzle is set to open at too low pressure, the fuel jet does not atomize properly and it may not penetrate the dense air charge in the combustion chamber. When the pressure is too high, part of the fuel will cross the combustion space and a portion of the spray impinges on the relatively cool metal walls of the combustion chamber and piston crown, which seriously interferes with the efficiency of combustion, and results in the waste of fuel, as well as a smokey exhaust. If the injection is set to operate at a relatively high or excessive pressure, this pressure also causes wear on the fuel pumps, and perhaps a shoulder is worn on the ground surface of the needle valve. A slight wear on these parts upsets the proper function and jet formation is distorted.

In the early types of solid injection engines, the fuel was introduced as a solid stream through a single hole orifice in the nozzle tip. This type of injection resulted in a slow and incomplete combustion, smokey exhaust and a dirty engine. This was accompanied by excessive temperatures and loss of efficiency. Later developments in the high speed engine introduced the multi-holed nozzle tip that distributed the fuel from as many as three to six well directed orifices in the nozzle tip. A better mixture and more complete fuel atomization was realized. This also made necessary a higher injection pressure which produced the spray. The modern engines gained much in efficiency as a result of these improvements in the injection system. The advantages of the present day fuel injection system should be kept in mind and an effort made to realize them in better maintenance. These are summarized:

1. More complete mixing of the fuel and air.
2. Reduced fuel consumption per output.
3. A clearer and cleaner exhaust at lower temperature.
4. Reduced heat to be dissipated with the cylinder.
5. Higher power rating per unit of cylinder displacement.
6. Higher engine speed, made possible by the more rapid and complete combustion.
7. Greater reliability and economy of operation.

However, if the operator is to obtain these advantages in the new engines, certain precautions should be observed. When nozzle tips become dirty or plugged up, or when the injection pressure is allowed to vary from the predetermined pressure set by the builder, much of these advantages will be lost.

Nozzles are subject to wear and misadjustment on account of the nature of the functions which they are built to perform. The nozzle is required to open and close several hundred times per minute, and must operate on a timed basis to control the fuel injection under an exceedingly high pressure. And if the holes in the nozzle tip become plugged with dirt, carbon or any foreign matter, or if they become worn to a larger size by gritty fuel, the effectiveness of the nozzle as an atomizer is reduced.



Cross section view of modern injection nozzle for a Diesel engine showing details of construction

The needle valve may develop a shoulder on account of its continued use in admitting and cutting off a stream of fuel that passes through under high pressure. The needle valve may be prevented from forming an effective seal at its seat in case the spring does not exert an axial pressure on the needle. In the event that the spring exerts an eccentric, rather than a concentric or axial force on the needle, it is said to be side-loaded. This spring which is used to load the needle valve and determine the opening pressure may sometimes lose its strength, or its adjusting screw that controls its slip may become loose, or slip. These various misadjustments and kinds of wear are normal to operation, and in the natural course of operation will upset the operation if not replaced.

Therefore the operator should give careful attention to the maintenance of these parts, and adjustments which determine if and when they are functioning properly. It is advisable to replace these parts when there is doubt as to their proper functioning. It is not always possible to determine if such is the case by inspection of the parts, since measurements so very minute are not feasible in the field, and usually are beyond the experience of the operator. It is the engine function alone that affords the operator the proper basis for decisions as to replacement of these parts in many cases.

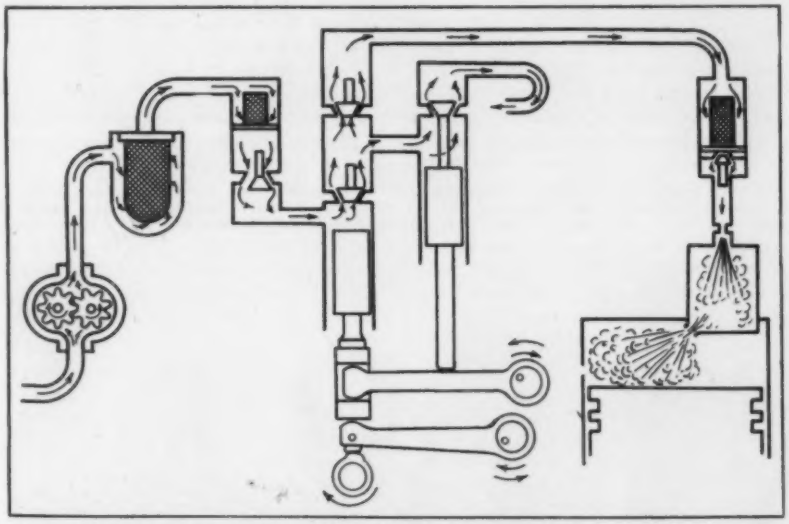


Diagram showing fuel system of Diesel engine which is of the constant stroke, mechanically-operated by-pass valve type

Classify Below Ground Level

Haul material to plant in 14-ton loads by Diesel-powered trucks. Blend four gravel sizes in tunnel conveyor, and operate weigh batch plant for trucks

View of modern sand and gravel plant recently placed in operation by The Arundel Corp., Baltimore, Md. Primary crushing and sand separation on extreme right, truck loading bins on left

By BROR NORDBERG

LATE IN 1940, the Arundel Corp., Baltimore, Md., made another expansion in production capacity when the new Linthicum sand and gravel plant went into production. This new unit, in Arundel county, six miles from downtown Baltimore, is a land operation which was built for its greater efficiency as compared with floating plants in producing relatively small tonnages.

Incorporated in the design are many ideas which, while not entirely new to the Arundel Corp., should be of benefit to producers of sand and gravel generally. The plant, which is a pit operation of 200 tons hourly producing capacity, has a loading out capacity of 350 tons per hour, entirely by truck.

Plant layout is in three parts: a scalping screen and crushing unit which contains the sand classification equipment; a washing and screening unit for gravel with bin storage of 400 tons over a reclaiming tunnel belt conveyor; and a dispatching unit consisting of 600 tons storage capacity and weigh batchers. Belt conveyors are the means of transportation between each unit.

Excavation Below Water

Up to 100,000 tons storage capacity in open stockpiles is provided for with a long boom, full-revolving clamshell to fill the stockpiles from open top plant bins, or pockets, and to reclaim any of the product to these same bins. Sand is classified and dewatered at the scalping screen, below the ground level, as the only satisfactory means of handling wet, soupy material without dredging.

Excavation in the pit is by means of a 2¾-cu. yd. Marion dragline powered by a Waukesha-Hesselman oil engine. This machine has an 85-ft. boom. Much of the material is taken cut 14 to 20 ft. below water and loaded into trucks for delivery to the plant. It therefore contains enough water to make handling difficult in a non-hydraulic plant, but is satisfactorily taken care of by classifying the sand before transporting, which is the reverse of the usual practice.

About 60 percent of the pit run material is gravel and 5 percent is larger than a 2½-in. sq. screen opening and must be crushed. There is no stratum of clay in the pit as it is worked, but there is present some clay which is removed by scrubbing and washing.

Transportation to the plant is in

Separate belt conveyors carry sand and gravel from scalping unit to sizing screens. Sand conveyor is directly under gravel conveyor. Note picker's protection

Finish screening plant and pocket bins for reclamation back to shipping bins. Sand and gravel conveyors leading from scalping unit shown to the left

three rear-dump Euclids powered by 150-hp. Cummins Diesel engines. These hauling units average 14 tons to the load and dump over grid bars spaced 6-in. apart to reject boulders. Throughs are fed from the hopper below the grizzley into a 60-in. inside diameter by 28-ft. long Telsmith revolving screen and wash water is furnished by a valve-controlled water jet. Eight feet of the screen length is a scrubber section.

This screen makes a double separation. Plus 2½-in. gravel to be crushed is elevated by a 30-in. chain-type Link-Belt bucket elevator, 30-ft. centers, to discharge into a Farrel-Bacon jaw crusher. The sand jacket is mostly of 5/16-in. sq. openings, with the round gravel over 2½-in. size the feed to the sizing screens.

Scalping unit below ground level comprises a revolving screen, bucket elevator for oversize to jaw crusher; two sand classifiers and dewaterers below screen. Trucks dump material from ramp on other side

Sand Classification at Scalping Screen

All the sand classification and dewatering is completed at the scalping unit, with sand classifiers and the revolving screen located well below the ground level. Sheet steel piles were driven around a circular pit some 20 ft. in depth and sand classifiers installed. Having the necessary depth of pit, oversize material is elevated to the previously-mentioned crusher located adjacent to the grid bars over which the trucks dump. This is an added convenience, since plus 6-in. boulders are picked up by the men and dropped into the crusher, which discharges back into the revolving screen.

Sands are classified (only concrete sand) in two Dorrco bowl classifiers each of which receives half the sand passing through the revolving sand screen. About 2000 g.p.m. of water is handled through the revolving screen which is in excess of the amount required for most efficient operation of the classifiers.

An intermediate step is introduced in the flow between the discharge of all water and sand from the revolving screen and the classifiers. The arrangement is such that half of the sand is passed to each classifier and the passage of water to each classifier is limited to about 750 g.p.m. All excess water overflows to a sewer.

Accurate blending by lever-controlled gates under various sized materials. Signal system has been installed in the tunnel to instruct the operator when gradation is to be changed

Single Conveyor Gallery Supports Two Conveyors

A concrete sand is produced which is about 14 percent through 50-mesh and has a water content of 16 to 17 percent. Silt is washed out in the classifiers and the overflow wasted to the sewer.

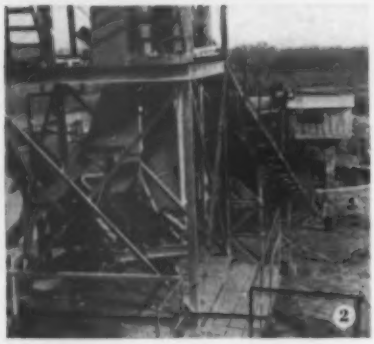
Gravel and sand are then transported by belt conveyors to the sizing tipple, where the gravel is graded and the sand and gravel sizes are dropped into bins. These belt conveyors, for gravel and for sand, are supported by a single conveyor gallery, with the gravel belt over, rather than alongside, the sand belt since it was desirable to have a central discharge for both sand washers. These conveyors are on about 275 ft. centers, and travel at 300 f.p.m. and 400 f.p.m., respectively. The sand belt rises at an angle of 17 deg. and travels faster than the gravel belt to overcome the tendency for wet material to slip back.

Sand transfers on to a shuttle belt at the washing tipple which in turn discharges onto a stockpile within range of the stockpiling clamshell. Gravel is put over two 5- x 12-ft. double-deck Ty-Rock vibrating screens and sized into four fractions: ¼- to ½-in., ½- to 1-in., 1- to 1½-in., and 1½- to 2½-in. A four-way split is made to assist in getting the necessary accuracy in re-combining the separate sizes to produce a product falling within specifications having close tolerances. Taken separately, the four grades conform to some of the normal orders for gravel.

Two American Well Works pumps, in addition to delivering 2000 g.p.m. of water for the revolving screen, put 1000 g.p.m. over the vibrating screens. All this water is caught in a hopper under the screens, and flows by gravity through a spout into a tank and from thence into a sump in the sand classification pit. Here, the fines settle out and enter the washers along with their normal feed.

Easy to Blend Various Sizes

Storage for gravel is 400 tons in four sizes, each in a separate open bin or pocket, available for reclamation separately, or as a blend, on to



From top to bottom: 1—Trucks receive weighed materials direct from bins; driver merely turns in printed ticket. 2—Sand shuttle belt for stockpiling at head of finish screening plant. 3—Reclaiming belt conveyor under bins, transferring to belt going to truck loading bins. 4—Tractor and scraper used for stripping. 5—Long boom equipped dragline for excavation under water loading Diesel-powered trucks

the tunnel belt conveyor which fills the truck-loading bins. Gravel is placed in the bins by means of stone ladders to prevent breakage.

Handling into stockpiles and returning aggregates into the bins is done by a 320-B Bucyrus-Erie dragline converted to a 3-cu. yd. clamshell. A 175-ft. boom of aluminum alloy permits building a stockpile of 100,000 tons capacity from one permanent location of the machine. Sand is held 12 hr. for drainage before loading out for delivery. Live steam, developed in the clamshell machine, is piped under the bin stockpiles to prevent freezing at the drawoff gates over a 30-in. tunnel conveyor belt.

Blending is done with accuracy by levers controlling gates under the various sized materials, and a signal system has been installed in the tunnel to instruct the operator when a gradation is to be changed.

Weigh Batchers Simplify Handling in Trucks

The tunnel belt conveyor transfers to an inclined belt conveyor, about 225-ft. centers, which fills either of eight compartments in a 600-ton Blaw-Knox steel bin for direct loading into trucks. A turntable spout at the conveyor head pulley permits filling any compartment.

This completely enclosed bin with steam lines tapped into it from an auxiliary boiler for winter operation, has two 3½-cu. yd. Blaw-Knox weigh batchers and two Kron scales to weigh the material as it goes into trucks. Two trucks may be loaded simultaneously. Scales are equipped to print exact weights on a card which is dropped through a chute to the truck driver.

By equipping the plant with weigh batchers, aggregates may be weighed out in bulk trucks, in batch trucks or ready-mixed concrete trucks could be accommodated. All trucking thus far has been done on contract. Discharge spouts under the batchers are equipped with movable extensions, quickly moved into place for low-bodied trucks. Maximum head room is 11 ft. 6 in. Concrete driveways have been laid throughout the truck-loading area.

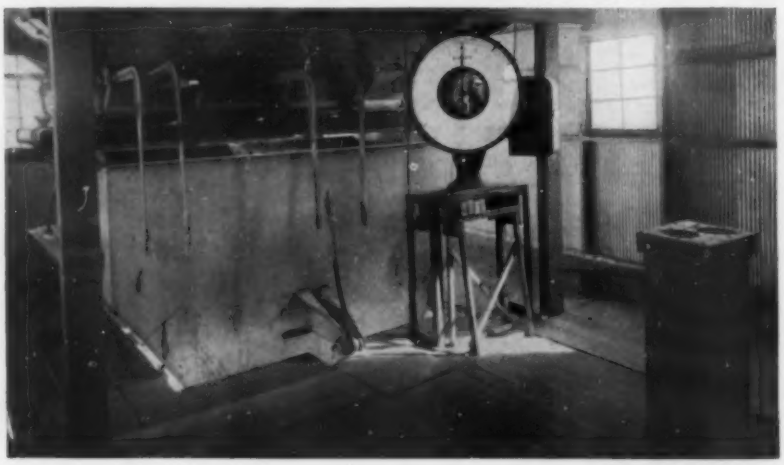
Recent Improvements

Since the plant was photographed, a 5- x 12-ft. single-deck Ty-Rock screen has been installed for rinsing material as it is reclaimed from stockpiles. This unit, located at the end of the blending tunnel, is arranged for use only when necessary.

Work is also being started on an additional screening and crushing unit in which all gravel can be reduced to minus one inch and then fed back into the main system or bypassed for a 100 percent crushed product, varying in gradation from 8-mesh to 1½ in. (square opening). The principal purpose of this unit is to vary the size of products to meet the demand and thus avoid the unbalancing of stored materials.

G. H. Bacot, vice-president in charge of materials production of the Arundel Corp., designed the plant. Harry Brannon is superintendent, and S. B. Fitzpatrick, assistant superintendent.

One of the two batchers for weighing and loading out trucks from bins. Note drop chutes for lowering printed weigh tickets to truck drivers



Developing new granite quarry of the Superior Stone Co., near Charlottesville, Va.

Crushing Tough Granite

Opening new quarry in rugged mountainous country introduces difficult drilling, blasting and haulage problems

RAILROAD BALLAST and commercial crushed stone are being produced at the rate of 150 tons per hour by the Superior Stone Co. of Raleigh, N. C., in a new granite plant built last winter at Red Hill near Charlottesville, Va.

Official personnel of the Superior Stone Co. is largely composed of prominent crushed stone producers who for many years had operated the Raleigh Granite Co., largest producer of crushed stone in North Carolina.

It is a washing plant located in rugged, mountainous country on a site which had never been exploited for quarry operations. Quarrying to open the deposit was a difficult job, since the rock is a massive granite which is being worked into a mountain having a constantly increasing height of face as operations progress. This tough rock shows a loss of only 22 percent when subjected to 500 revolutions in the Los Angeles rattler test machine.

Location of the plant is alongside the main line of the Southern railroad on comparatively low ground, with the quarry face being opened several hundred feet away.

Granite crushing plant. Quarry trucks come in to dump at primary crusher, extreme left; secondary crushing is done in center building; and final screening unit and storage, right

Well Drills Supported by Timber Platforms

A 90-ft. height of face has been developed. Despite unfavorable topography, requiring the use of considerable supporting timber and bracing, well drills are being used to sink 8-in. diameter blast holes. Three Sanderson cyclone type, powered by 15-hp. motors, drill the 8-in. holes and an Ingersoll-Rand tripod type drills 1¼-in. diameter holes for the primary drilling. The large holes are set off with 7½- x 24-in. size Nitramon blasting powder. Secondary

Above: Excavating with steam shovel in new granite quarry. Semi-trailer tractor trucks haul stone to the plant

Conveyor on left reclaims stone from storage and transfers into the one at the right for loading cars. Note grenade fire extinguishers on electric switch board, to the left

drilling is done entirely by jackhammers. Before starting these operations, some deforestation work was necessary as well as preliminary stripping. A ½-cu. yd. Northwest gasoline shovel is used to remove up to 10 ft. of top soil, which is disposed of.

The plant is laid out in three divisions; the primary crusher, scalping screen and secondary crusher building, and the finish screening end, all connected by belt conveyors. At present, better than 50 percent of the production is ballast but eventually commercial stone production will be of equal importance. Washing is not required, but all stone is being washed to keep the plant in cleaner shape and to improve screening performance in wet weather. Finished material is stored in the open under the sizing screens, partitions separating the sizes, and is withdrawn on a tunnel belt conveyor for direct loading into railroad cars. Conveyors are to be rearranged later to permit truck loading as well.

Excavating is done with a 2-cu. yd. Bucyrus-Erie steam shovel loading into either of two 12-cu. yd. Easton side-dump semi-trailers hauled by 95-hp. Ford tractors. These semi-trailers are dumped by an Easton pneumatic hoist into a 42- x 48-in. Traylor Bulldog jaw crusher, which discharges a minus 7-in. product on to a 36-in. belt conveyor, 125-ft. centers, feeding a scalping screen. A 150-hp. electric motor drives the crusher through Texrope.

The scalper is a 72-in. by 120-in. Robins Gyrex double-deck vibrating screen which makes a separation for feed into each of two secondary crushers and passes on stone of proper size to the finish screens. Oversize from the top deck, which is of perforated manganese steel plate, is put through a No. 14 Traylor gyratory crusher, and intermediate sizes through a 3-ft. Symons cone crusher, feed to the latter depending upon what is required in size. A 75-hp. motor drives the gyratory and one of 50-hp. the cone crusher, both by Texrope. Normally minus 1½-in. through the bottom screen deck is conveyed to the washing and sizing plant, but this stream can be diverted to the cone crusher which can be set up tight to produce chips.

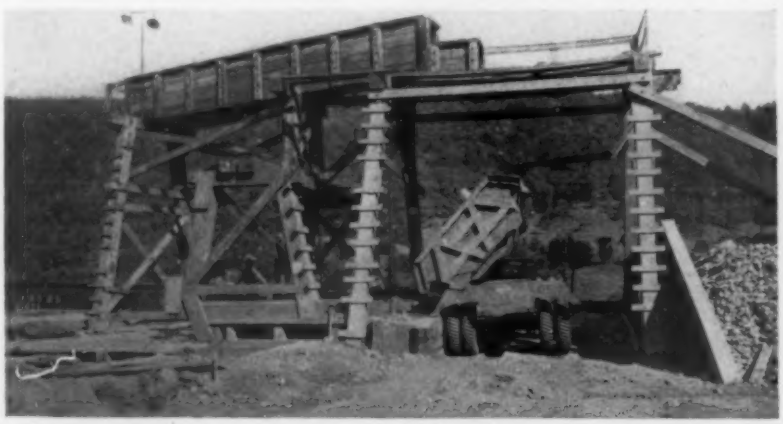
Conveyor Belt Serves Two Purposes

Both secondary crushers discharge on to a single belt conveyor, 75-ft. centers, which in turn discharges on to a small surge pile over the belt conveyor carrying stone from the nearby primary crusher, where the belt is underground.

In other words, this belt serves two purposes; to deliver stone from the primary crusher and to return to the screening plant stone that has been crushed down further. This surge pile, which has a very limited free flowing capacity, pays out stone on to this belt continuously through a manually-operated bin gate. It is not intended as a big reserve for times when the quarry is inoperative but serves the purpose of keeping the sizing screens reasonably loaded even though the quarrying operations and the passing of stone through the primary crusher are intermittent operations. It is pretty well agreed that vibrating screens are more efficient in sizing when they are kept uniformly loaded at or near their capacities.

Throughs from the scalping screen are conveyed over a belt to the sizing screens, which consist of a 5- x 12-ft. Tyler double-deck Ty-Rock vibrating screen for coarse sizing followed on a lower level by a 48- x 102-in. Robins Gyrex double deck vibrating screen for fine sizing. Feed to the lower screen is minus ⅜-in. which is split into a No. 4 to ⅜-in. size for bituminous work and into a ⅛- to ¼-in. product which is a sealstone. Minus ⅛-in. stone enters a 48-in. sand drag, and the "sand" produced and dewatered here is sold for various applications locally. Manually-operated

(Continued on page 51)



Close-up of semi-trailer tractor trucks dumping into primary crusher

Reducing B.t.u. Loss In Dry Process Kiln

Dampen dry pulverulent raw material in pug mill before introduction into kiln in a thin layer over suction grate to make it gas-permeable for maximum heat transfer

By P. T. LINDHARD, M.E.*

P. T. Lindhard

EVER SINCE the days of the continuous shaft kilns, such as the Aalborg kiln, the Deitz kiln, and the Sneider kiln, great efforts have been made to improve the fuel economy of the rotary kiln for the production of portland cement clinker by the dry process.

Fuel consumption of the improved shaft kilns varied from 45 to 55 lb. of coal of from 12,000 to 14,000 B.t.u.'s per lb. per bbl. of clinker produced; whereas the rotary kiln for burning a dry mix in pulverized form would run from 100 lb. of coal per bbl., and upwards.

The advantages of the rotary kiln, however, in other directions were so great that it found its place in the portland cement industry at the change of the century, and has held it ever since. But the fuel economy remained very poor.

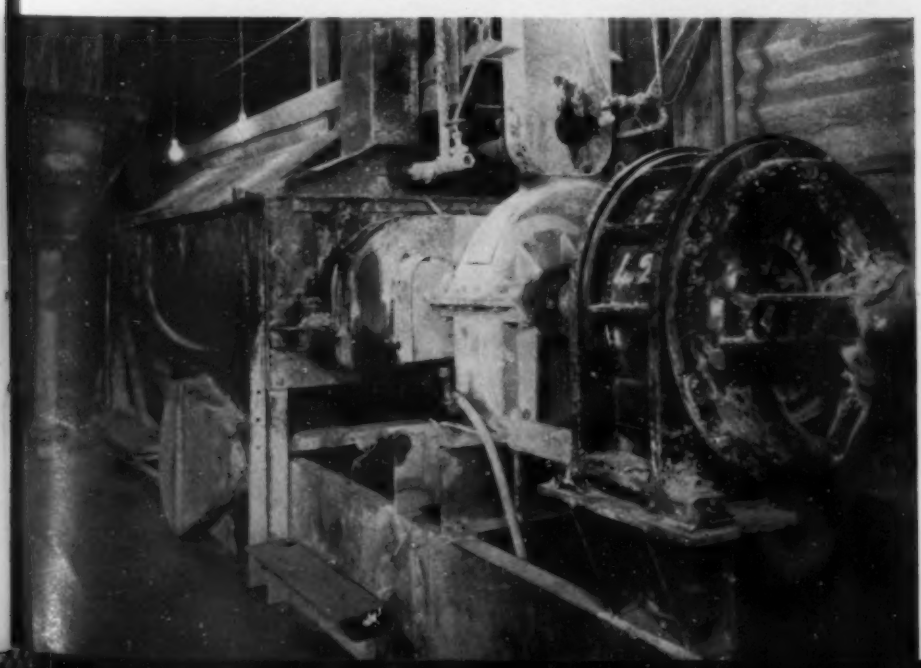
When the wet process was introduced during the years from 1907 to 1914, the fuel consumption in the wet process rotary kiln even increased to 150 lb. per bbl. and upwards. This increased fuel consumption was the greatest deterrent to the introduction of this process. Gradually the economy of the wet rotary kiln was improved, and from about 1925 new improvements in the kiln cut the fuel consumption in rapid strides, until the present day when it is possible to burn a wet mix in a modern rotary kiln with about 70 lb. of coal per bbl. Thus, in a wet process kiln, means were found to accomplish what the simpler dry process kiln had been waiting for more than 30 years.

Looking toward end of kiln containing suction grate through which hot gases permeate thin layer of moistened raw material. Note construction of kiln seal

When we look about to discover the reasons for this astonishing fact, we find that in the wet process rotary kiln, as in the shaft kilns of yonder years, the heat transfer from the gases to the material is excellent; while in the case of the dry burning rotary kiln, it is very poor. The question, thus, of accomplishing the desired results was narrowed down to finding a way of transferring the heat in an efficient manner from the combustion gases to the cold raw material entering the feed end of the kiln.

Long years of study have shown that the most efficient way to transfer heat from a gaseous fluid to a solid material is to pass the heated gases through a permeable layer of the material itself. However, a means had to be found of making it possible to prepare the dry pulverulent material so as to make it gas permeable.

Below: Pug mill moistens dry, pulverulent raw material which is then discharged into a distributor that places it on the suction grate in a uniform layer



Moisten Dry Material to Make It Gas Permeable

It was discovered that by moistening the dry dust with a limited amount of water in a pug mill, or some similar device, the resultant material became gas permeable when spread in a thin layer upon a grate with sufficient passage for the required gas volume, but through which only a very small quantity of the moistened material would pass. It was also discovered that the draft necessary to draw the required quantity of gases through the layer was sufficient

* Retired chief engineer, F. L. Smidth & Co., New York, N. Y.

to hold the material to the grate, even if turned upside down. Thus, engineers of F. L. Smidth & Co. developed the suction grate kiln. The very name is derived from the fact that the material is held to the grate by the draft from an induced draft fan.

Installation in Canadian Plant

The investigations proceeded until some plausible designs had been developed, and a full sized installation of the device was eventually introduced in a Canadian cement plant.

One of the existing 8½- x 9½- x 150-ft. dry kilns was shortened about 30 ft., and the suction grate attached to the feed end of this kiln.

The suction grate consists of a cylindrical section connected by a conical transition piece with its narrow end to the 8½ ft. shell. Inside of this cylindrical extension is secured a cylindrical grate, about 5 ft. long and 11 ft. 6 in. in diameter and spaced from the shell by about 6 in. The grate is supported by a series of longitudinal ribs located in the 6-in. space, and serving to divide the space into cells communicating at their lower ends with a collecting ring surrounded by a suction mantle, which, in turn, is connected to the suction side of an induced draft fan. Only about three-fourths of the cells at a time communicate with the suction means, so that about 270 deg. of the grate is under suction.

The material is distributed evenly along the grate in a thin layer about ⅞ in. thick, on its descending side, about 20 deg. above the lowermost point, and is carried by the grate on its ascending side upwards past its uppermost point as the kiln rotates until the 270 deg. arc has been completed. At this point the suction is automatically cut off and the dried crust is discharged into a short feed screw and conveyed into the kiln, past the inner end of the grate. The material is subjected to the action of the gases for only about one minute.

The temperature of the gases discharged from the calcining zone directly into the interior of the suction grate is about 1500 deg. F. Almost immediately when the gas strikes the material on the grate, the surface of the layer becomes incandescent, indicating that a major portion of the material has reached a temperature close to that of the gases before it is discharged from the grate.

The temperature drop in the gases when passing through the layer is about 1000 or 1100 deg. F. This temperature drop thus represents the amount of heat saved by the suction grate principle.

Repeated tests, however, failed to show any drop in the CO_2 content of the raw mix after having been penetrated by the heated gases on the grate, and thus it must be concluded that the calcination does not commence until the dried and highly preheated material has entered the calcining zone of the kiln proper.

When the dried crust drops off the grate, it breaks up into pieces about the size of pop corn. This material is excellently adapted for calcination and clinkering in the kiln, and does not change materially in size when discharged from the kiln as well-burnt clinker. The grindability of the clinker was improved so that the same finishing mills gave an increased output of about 35 percent.

Operating Experience Reveals Economies

Naturally, as in the preliminary stages of any new device, some initial difficulties were encountered but it was demonstrated that the principle was sound. Improvements were then made in certain parts of mechanical equipment overcoming the initial difficulties. For instance a more satisfactory grate was devised which has now been in operation over a long period without entailing the slightest cost for repairs or for loss of time.

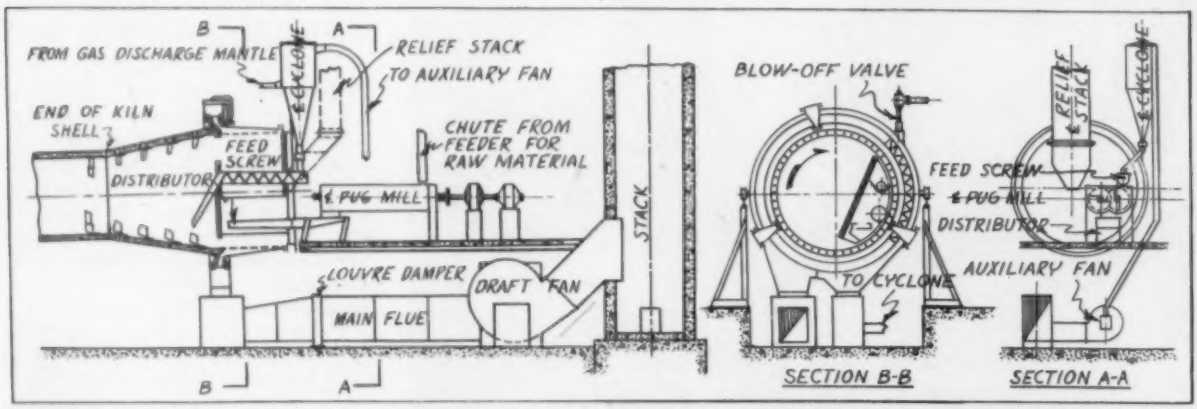
The coal savings mounted rapidly. The operation improved in every way so there was no need of starting up an old kiln that had been held in reserve. The output was increased by 100 to 150 bbl. per day and the coal consumption proved so favorable that it did not pay to operate the old kiln at all. The loss of time for stoppage during that entire season amounted to less than one percent.

During the next season the kiln operated for 220 days and the total loss of time during this period due to the equipment amounted to 35 hours 42 minutes or only 0.7 percent of the total operating time.

Construction Details

The drawing shows a longitudinal elevation partly in section, an end view marked section A-A, and a cross section marked section B-B. The longitudinal section shows the grate in dotted lines, the pug mill, the distributor, the loading chamber which is cantilevered from the stationary end shield and closed at its inner end, and the feed screw with a chute to deliver the material to the flights in the wide end of the transition piece. The flights convey the material into the end of the kiln proper where it joins the narrow end of the transition piece. The cells are also shown where they join at the lower ends with the gas discharge mantle.

In section A-A is shown the end view of the pugmill; the cross section of the loading chamber and the cells may be seen in section B-B. The inclined shield shown in the same cross section is lined with fire bricks to protect the moving parts in the loading chamber from the radiated heat in the incandescent layer of material on the grate. These parts consist of the feed screw, a rotable wire brush for occasional cleaning of the grate



Sectional views of kiln equipped with suction grate. Left to right: longitudinal elevation showing location of equipment, section B-B, cross section at suction grate, and section A-A, end view showing relative position of pug mill, relief stack and cyclone

(this brush is withdrawn from the chamber when not in use) and the distributor.

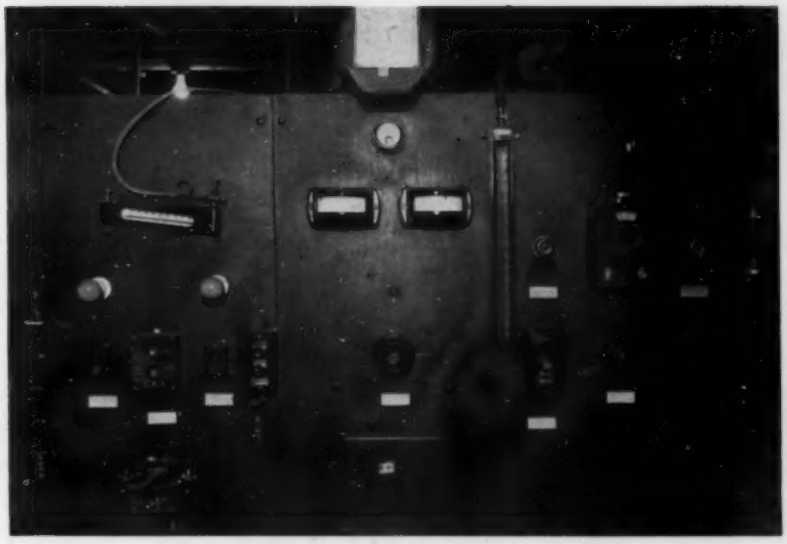
The gas mantle does not cover the whole circumference at the collecting ring, but is substituted by an arched lattice girder on the open side to serve as a support for the mantle. The open ports on this side of the collecting ring are provided with a cover on which the collecting ring slides. The upper end of the cover cuts off the draft as the ports pass in under the cover. This cover at its topmost point is provided with an opening registering with the ports in the collecting ring consecutively as the kiln rotates.

The opening in the cover is connected with a special blow off valve so arranged that a measured quantity of compressed air is released at the instant a port registers with the opening. This charge of air is stored in an air vessel connected with the valve, the volume and pressure being predetermined. The air vessel is immediately re-charged as the valve moves back. This blast of air, into the ports, in the opposite direction of the draft, dislodges any particles of material which may still adhere to the grate after the suction is cut off and the material allowed to drop into the feed screw by the action of gravity. The abrupt discharge of the compressed air makes its action very effective and also saves air.

The grate, thus being cleaned, is ready to receive a new layer of material at the point of distribution below the blow off. The valve is operated automatically by the kiln rotation.

As previously mentioned, a small amount of the moistened material drops through the grate at the point of distribution, which takes place immediately above the lower lip of the covering plate, so as to allow the new layer to settle down on the grate quietly before the suction is re-established, as the grate passes out from under the plate, and is held firmly to the grate by the suction from the draft fan. At this point, the heated gases pass through the fresh layer with great rapidity, and sweep the cells clear of the material which has been lost through the grate.

This material is then immediately discharged into a preliminary and smaller compartment of the gas mantle, and removed by the draft from an auxiliary fan into a cyclone, where it is collected and discharged through an airlock into the feed screw, thus by-passing the pugmill and the grate, and delivered with the preheated material directly into the kiln. By this process complications are avoided in remoistening the material and the heat otherwise required for the evaporation of the water is saved.



Control board for kiln equipped with suction grate

The preliminary and smaller compartment of the gas mantle is separated from the major and larger compartment by an adjustable plate. This latter connects directly with the main flue to the draft fan. The gas discharged by the auxiliary fan is delivered to the main flue between the louvre damper and the main fan.

Kiln Operation

With the above explanation, it should be easy to follow the sequence in the operation of the kiln.

The dry pulverulent raw material is delivered by the feeder in a uniform stream to the pugmill, where the proper amount of water is added, also in a uniform stream so as to keep the moisture constantly at the proper point. The moistened material is discharged into the distributor and placed upon the grate in an even uniform layer. The layer travels along with the grate, and is exposed to the action of the gases for about a minute or ¾ of a revolution of the kiln; is then released and carried into the kiln proper in a highly preheated state by the feed screw, and calcined and clinkered in the usual manner. The size and character of the predried material facilitates the two latter processes very much.

The kiln is provided with a relief stack which is necessary when starting up, so as not to overheat the grate when it is not protected by material. This stack has another function, however, in that it keeps the draft uniform by an automatic control device, and at the same time relieves the kiln of alkali fumes, which may interfere with the permeability of the layer, and thus with the draft.

As the alkalies in the raw material are volatilized in the clinkering zone, they are carried with the gases through the layer on the grate. Some of the alkali fumes, however, will condense and remain in the layer, and thus will be carried back through the calcining zone until they are re-volatilized in the clinkering zone and carried back with the gases once more. When the concentration increases, it interferes with the draft, and the relief stack is automatically opened, and some of the fumes discharged into the atmosphere until a proper balance is reached. The alkali content in the clinker is kept well within the permissible limits.

The kiln is provided with an especially accurate feeder giving practically no variations in the flow of raw material. The water control likewise is excellent. The kiln will operate hour after hour without re-adjusting the water or the raw feed.

The installation includes all the necessary gauges and instruments to insure absolutely uniform and efficient operation; also a gas analyzing device with graphic records of the CO_2 and $CO+H_2$ in the gas.

No dust can escape through the layer on the grate. The only dust would come from the material that drops through the grate at the point of distribution and this is caught in the cyclone and returned to the kiln.

A kiln 9½- x 8½- x 130-ft. with suction grate attached has a capacity of about 1100 bbl. when properly insulated and equipped with the proper type of cooler, and a heat consumption of from 725,000 to 750,000 B.t.u.'s per bbl. may be expected.

Center Burner Shaft Lime Kilns

Result of many years experiments, experience and observations

By VICTOR J. AZBE

WITH INCREASING INTEREST shown in the performance of center-burner gas-fired, shaft lime kilns, it might be well for me at this point to quote from the preamble of a patent issued to me May 7, 1940 (No. 2,199,384), because it describes the advantages of center-burners as well as other features more or less dependent on burner design.

As the editor of ROCK PRODUCTS and the majority, at least, of the lime industry knows, I am not a manufacturer of lime kilns or lime plant equipment of any kind. I am a consulting engineer and designer of lime kilns and lime plants; and the purpose of an engineer in patenting a design is of course only to protect some of his own ideas from misapplication by the uninitiated. To return to the patent preamble:

"Many lime plants have large piles of wasted spalls that have been accumulating through years and for which there has been no use. This is because only rock of large size could be burned in vertical kilns, since gas could not well be equally distributed when the shaft was filled with small rock or spalls. By means of this invention, the burning of spalls in vertical kilns not only becomes practical but preferable to burning of large shapes that tend to present a relatively small surface for heat absorption.

"Even when limestone is very pure and impure compounds cannot form to any great degree, exposure to excessive temperatures for variable lengths of time impairs the quality. This is because of shrinkage and reduction of free space between unit cells of calcium oxide. Reduction need not be great for the free space to become less than the dimensions of water molecules, thus interfering with slaking. Hence settling rates, availability and plasticity, and all other important factors, become impaired.

"The kiln incorporates features which effectively avoid the occurrence of this undesirable action through provision for control of zonal temperature, distribution of heat, rate of draw, and location of draw.

"The invention also includes a novel method of introducing gas for combustion and a novel method of delayed combustion that tends to produce highest temperature when deleterious action on the stone is least likely to take place, and lowest temperature when such action is most likely to occur.

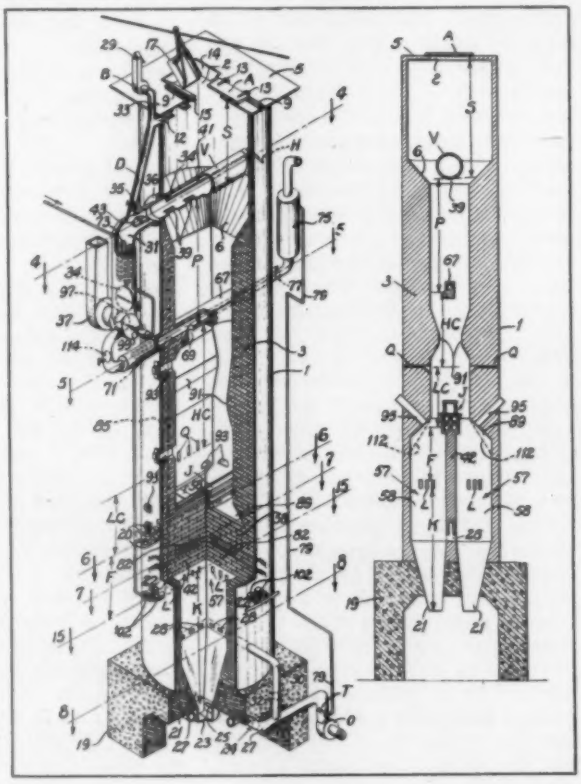
"Prior lime kilns also present difficult refractory problems. Highest temperatures are developed along the walls, and the calcium base of the lime combines with the comparatively acid silica of the refractory. This is aided by the alumina and fluxes of the refractory and by the impurities in the lime. As a result, the surface of the high-melting-point brick changes to a low-melting-point slag which at ordinary kiln temperatures, tends to retain its shape, but which is semi-fluid. The action penetrates deeper with progress of time. This converted mass finally melts and runs when temperatures become higher. Thus some kilns needed to be repaired every few months, and all have had comparatively short lives. This invention overcomes this slagging difficulty very effectively by removing the high temperature zone away from the kiln lining, and by other means to be described.

"Many conventional vertical kilns have three operating zones, namely, pre-heating, calcining and cooling. Some operate with only two zones; namely, pre-heating and calcining, these two being very indefinitely defined.

"The lime kiln of the present invention is divided into six zones; namely, (1) storage and drying zone, (2) preheating zone, (3) upper calcining zone, (4) lower calcining zone, (5) finishing zone, and (6) cooling zone. By this means, control is obtained that greatly enhances quality, quantity, and efficiency."

LIME FORUM

Mr. Azbe, consulting engineer, is a contributing and consulting editor of ROCK PRODUCTS. He will be glad to receive inquiries from his readers, and will answer these direct or through the columns of this Forum.



Part of patent office drawings showing design for center-burner, gas-fired shaft lime kiln

Tilting Tank Classifiers

Article 19 describes automatic sand settling tanks which have the counterweight on a lever arm and have moving valves for releasing classified sand

By EDMUND SHAW

THE ORIGINAL TILTING BOX had the counterweight attached to the sand receptacle. An improvement that suggested itself was to place the counterweight on a lever arm at some distance from the fulcrum. This gave an opportunity to use a smaller counterweight, which meant less inertia to be overcome when the tank was swung from a position of rest and also gave an opportunity of moving the counterweight (instead of changing the load) for adjusting.

F. M. Welch, chief engineer of the American Aggregates Corp., (F. M. Welch Engineering Service) who had designed many sand and gravel tanks and several forms of automatic sand settlers, has a tilting tank of this kind. In a letter to the writer he gave his reasons, and they are so interesting that they are reproduced here.

"I found that so far as the sensitiveness of the tank was concerned, the fewer working parts the better, and if a tank could be designed with nothing supporting it except two knife-edge fulcrums, it was sufficient.

"I further found that an ordinary pipe for a valve, attached to the front end of the tank near the bottom, butting against a timber with a piece of belting nailed on the timber for a valve seat, made just as good a valve as any, provided care was taken to see that the valve fitted tight when closed.

"I further made up my mind that the mistake which everyone was making, including myself, was in building a tank so that the compartment containing the sand was not definitely on one side of the fulcrum and the counterweight definitely on the other side of the fulcrum. I woke up to the fact after seeing a few clumsy wooden tanks which were working perfectly, and the secret of their success was in these two points.

"Therefore I set out to design a steel tank of as simple construction as possible, with nothing but knife-edge fulcrums on both sides to support it (thereby practically eliminating friction) and seeing to it that the sand was definitely on one side of the fulcrum and the counterweight on the other. After designing such a tank, and building a few of them, we found that it was so sensitive that it would tilt when a handful of sand was thrown into the sand compartment."

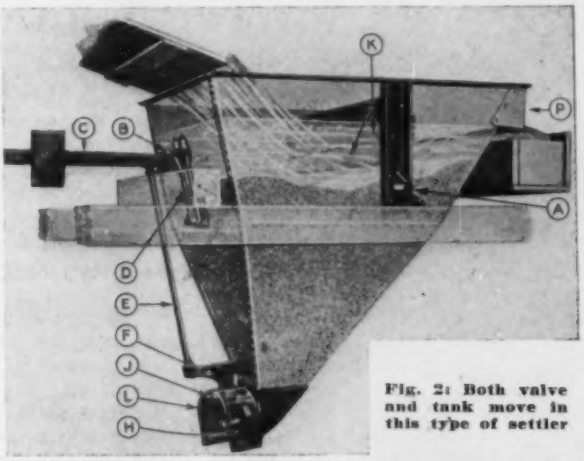


Fig. 2: Both valve and tank move in this type of settler

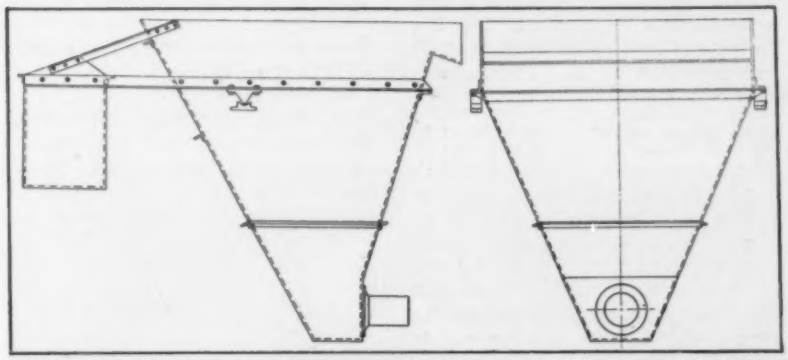


Fig. 1: Settler with counterweight set out to be definitely on other side of fulcrum

Features of Design

This settler is made by the Greenville Manufacturing Corp., Greenville, Ohio, in two sizes called "five-foot tank" and "six-foot tank." It is shown in side and end elevation in Fig. 1. The five-foot tank is 5 ft. long and 5 ft. wide and has an overall depth of 5 ft. 6 in. The six-foot tank is 6 ft. 6 in. long, 6 ft. wide, and 7 ft. deep.

The shape is roughly an inverted pyramid and it has several sliding faces. The least inclination of any of these is 62.5 deg., which, according to the writer's experience, is enough to prevent "hanging in the corners" and should insure a steady discharge with any sand ordinarily collected in a sand tank. No recommendations were given

TABLE OF SIZES AND CAPACITIES OF TILTING SAND-SETTLING TANK

Number of sand tank	5	6	7	8	10	12
Cubical contents, cu. ft.	50	80	120	155	265	492
Capacity in coarse sand, cu. yd. per hour, about	15	25	35	50	85	160
Capacity in fine sand, cu. yd. per hour, about	7-10	12-16	18-23	25-30	40-55	80-100
Weight of tank empty, lb.	900	1300	1650	2000	5300	9000
Weight of tank full, lb.	4700	7500	11000	14000	27500	50000
Water capacity, g.p.m., catching coarse sand	225-300	375-500	525-700	750-1000	1275-1700	2400-3200
Water capacity, g.p.m., catching fine sand	150-225	250-375	300-525	500-750	850-1275	1600-2400
Pitch of feed launder or flume, recommended	5 to 10 deg.	5 to 10 deg.	5 to 10 deg.	5 to 10 deg.	5 to 10 deg.	5 to 10 deg.
Width of feed launder or flume, recommended	3 ft. 6 in.	4 ft. 0 in.	4 ft. 6 in.	5 ft. 6 in.	7 ft. 0 in.	8 ft. 6 in.

by the makers as to the sizes to be used with different quantities of water or sand.

Settlers with Moving Valves

It was found that the tilting box might be constructed so that the tilting movement would open the valve at the same time it tilted the tank, thus giving twice the valve opening for the same movement of the tank. A number of machines embodying this idea have been built and placed on the market, but some of them employed such complicated systems of levers and had so many bearings that they would not work well after the bearings became a little worn and so they went out of use.

However, one type of settler using this principle has proven itself efficient and well able to withstand the rough usage of a sand plant, and a great many of them are in successful use. This is the Telsmith pivoted tank, made by the Smith Engineering Co., Milwaukee, Wis. The valve mechanism is simple and it is placed out of the way of sand and spill so that it does not wear readily. The main adjustment is by a counterweight sliding on a bar, but a further adjustment of the valve motion may be had by changing the position of one link. The fit of the valve may be adjusted by screws and nuts. This settler is shown in Fig. 2.

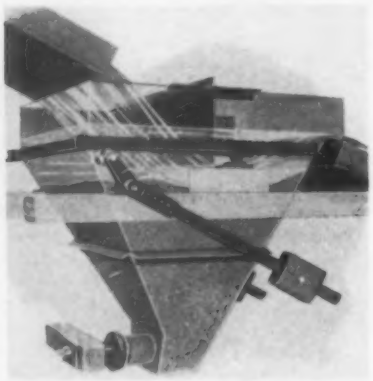


Fig. 3. Two counterweights and knife-edged fulcrum bearings help make this tank sensitive to adjustment

The makers guarantee that with sand containing not more than 25 percent of minus 20-mesh the product will not contain over 5 percent of free moisture and that the total moisture will not exceed 25 percent.

This settler is made in six sizes and the table on the preceding page, from the maker's catalog, gives the capacities.

The writer saw a great many of these tanks in various parts of the United States and heard no complaint from any of the operators concerning them. They were working well on fine sands as well as on coarse.

Another settling tank with the main adjustment made in the position of the counterweights and with a simple valve mechanism is the Eagle sand tank made by the Eagle Iron Works. This is shown in Fig. 3.

The tank pivots on two knife edged fulcrum bearings. This and the flat cone valve on a spindle, counterweights placed on a lever arm at some distance from the fulcrum, and an adjustable baffle plate give the tank its sensitivity of adjustment. When enough sand has settled to overbalance the weight of the counterweights, the tank tips away from the valve seat, allowing the sand to discharge through the valve opening.

(To be continued)

A. S. T. M. Committee on Lime Has Active Program

DURING THE SPRING MEETING in Washington of A.S.T.M. Committee C-7 on Lime, attended by 26members and guests, action was taken upon the following projects, those involving standards and methods of test to be submitted to the entire committee for letter ballot:

(1) Dr. F. O. Anderegg, Chairman of a Working Subcommittee on Lime in Mortar, submitted a preliminary report which included a discussion of the contribution of lime to the properties desired in mortars, and a brief resumé of the present knowledge of lime in mortar gained from studies made by investigators in the United States and foreign countries. A comprehensive bibliography on the subject was presented by the subcommittee, as an appendix to the report. It was decided to submit the report and bibliography to Committee C-12 on Mortars for Unit Masonry for its consideration.

(2) For the purpose of standardizing test conditions in connection with investigations on mortars, the following values were assigned to cubic foot quantities of the usual ingredients in mortars:

Lime hydrate solids*	50 lb. per cu. ft.
Portland cement	94 lb. per cu. ft.
Sand	80 lb. per cu. ft.

(3) The committee adopted a resolution presented by Subcommittee II recommending that an investigation of hydrated limes be made looking toward a revision of Standard Specifications for Hydrated Lime for Structural Purposes (C6-31) which would establish a maximum limit on the unhydrated oxides of calcium and magnesium.

(4) Consideration was given to proposed specifications for quicklime for causticizing purposes in the paper industry. Including certain changes which were suggested, these specifications are to be sent to all members of the committee for consideration so that action can be taken at the June, 1941, meeting.

(5) A canvass of the purchasing practices of leading varnish manufacturers was conducted by the committee during February, 1941. This led to the conclusion that no revisions were necessary in the Standard Specifications for Hydrated Lime for Varnish Manufacture (C47-27), which have stood without change since 1927. They, therefore, are to be continued as standard.

(6) It was decided to initiate a series of tests on the various sugar and other methods for determining available lime for the purpose of standardizing on a simple and fairly accurate method which can be used by the producer and consumer of lime products.

(7) Subcommittee V on Methods of Test has under way the development of analytical methods for determining the amount of arsenic, fluorine, and lead which may be present in lime used in the manufacture of food products.

(8) Data are being collected by the committee on the various methods used in slaking quicklime on the job for the purpose of duplicating these conditions in the laboratory and preparing a laboratory procedure on the slaking process.

(9) The committee authorized the initiation of a study on the factors which influence the settling rates of quicklimes and hydrated limes used for chemical purposes.

(10) Several revisions in the Tentative Methods of Physical Testing of Quicklime and Hydrated Lime (C110-38T) are contemplated but as the work incident thereto will not be completed in the near future, the committee decided to recommend to the society that these methods be continued as tentative for another year.

* A 50-lb. bag of hydrated lime shall be considered as one cubic foot of material. When quicklime putty is used, 50 lb. of solids in sufficient putty shall be considered one cubic foot of lime hydrate solids.

Below the screening tower are two rectangular concrete bins and the open stockpiles are divided between coarse stone storage to the right of the plant and storage of fines to the left

By NELSON SEVERINGHAUS*

Need Larger Stockpiles

Existing crushed stone stockpiling arrangements can be modified in several ways to meet varied specifications and sudden demands for tonnages greater than plant capacity

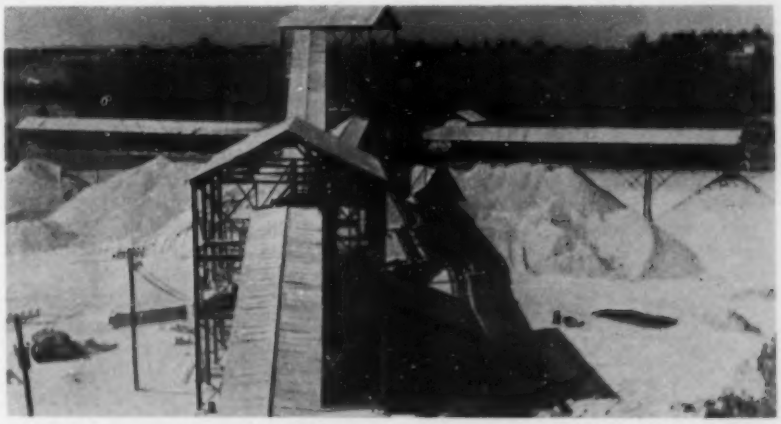
THIS ARTICLE is a slightly modified form of a paper presented before the operator's meeting at the twenty-fourth annual convention of the National Crushed Stone association, January 22 in Cincinnati, Ohio. It has been changed and illustrated with pictures of stockpiling at the Rock Chapel plant of the Consolidated Quarries Corporation by the author.

Perhaps the best method of illustrating our present keener interest in larger stock piles is to imagine a sort of average crushed stone plant and a few of the changing conditions which have confronted it in the past six months.

Our imaginary plant has an average working capacity of 100 tons of product per hour and is situated near a city of 100,000 population. The varied requirements of this city plus one or two road contracts at a time and some railroad ballast have kept the plant more or less busy, but have never taken more than 1500 tons in one day, or 25,000 tons in a month. Bins which hold about 500 tons each of five sizes supplemented by a crawler type clamshell crane stacking some 6000 or 8000 tons along the tracks have given this plant fairly ample storage. By running 10 or 12 hours per day in a rush month, the market was supplied without any need of a large finished stock. The men in the plant and quarry liked the extra time because of the extra money.

In the Fall of 1940, things suddenly changed for our peaceful plant of the imagination. The Army planned an airport ten miles away which would need 50,000 tons of aggregate, and call for a delivery rate as high as 1500 tons in a day.

A host of new problems immediately confront the operator. The airport job would last for less than two months but during that time shipments might well be beyond the 24 hour capacity of the plant. An investment of $25,000 in spare parts would not necessarily insure against a two or three-day shutdown when a cranky crusher broke a shaft.



In the foreground is the secondary crusher building and beyond it the screening tower and covered conveyor galleries for stockpiling

More Stockpile Capacity Will Be Required

Also imagine what a 40,000 to 50,000 ton stockpile would have done to avoid costly troubles. This much stock may seem very high for a 100-ton per hour plant, but I believe most of us should start thinking in terms of stocks two and three times as large as in the past to meet changed market and labor conditions and to avoid

*Superintendent, Consolidated Quarries Corp., Lithonia, Ga.

Two auxiliary means of stockpiling larger tonnages than provided for beneath the galleries. At the left is the ¾-cu. yd. clamshell and at the right is one of the two portable cable scrapers

increasing operating costs on intermittent operations.

Present day aggregate stocking and recovery methods for large piles may be classified under five heads as follows:

(1) Belt conveyors
(2) Cable drags and scrapers
(3) Clamshell bucket transfers
(4) Motor vehicles
(5) Bulldozers

Seldom do we find any one of these alone as a solution to the problem. A combination of two or sometimes three is more usual in practice. Each has its advantages and drawbacks which decide its use for any one job. In the following tables I have tried to assign relative values to these advantages and disadvantages, the figure 1 being most favorable, figure 5 least.

These relative figures are largely opinion based on observation of the various systems in use. If we grant them a reasonable degree of accuracy, they should aid some in choosing a new system or expanding an old one.

	Conveyors	Cable Drags	Clamshell Buckets	Motor Vehicles	Bulldozers
First Cost	5	1	4	3	2
Operating Cost	1	3	2	4	5
Breakage of Stone	1	4	2	3	5
Flexibility of Amt.	5	3	4	1	2
Flexibility of Hourly Capacity	1	3	3	2	3
Oper. Labor Req.	1	2	3	5	4
Ease of Change of Location	5	3	4	2	1

For example, if a relatively permanent and well financed plant considers installation of a large stock, a conveyor system for stocking and recovery will offer it the cheapest operating and generally most trouble-free installation. On the other hand, if the location is a temporary one, conveyors are about the worst method because of the high first cost and difficulty of moving and setting up properly.

Precautions to Avoid Segregation

A number of operating factors have not been tabulated in order to keep the table to workable size. One of the more important of these is segregation of sizes in handling. It is possible to stock and recover stone of a wide size range; for example, ¼- to 2-in., without serious segregation, but it is a difficult and tedious job and to my way of thinking should seldom be attempted. If stocking of such a size is considered necessary, size segregation may be prevented by layer placing and recovery with clamshell buckets but even this method requires a careful crane operator. If he forms any cone in placing or a hole during recovery, coarser material will roll down the formed slopes. With the more common methods of placing, such as dropping from a conveyor or scraping out on a triangular section pile, it is my opinion that 2 to 1 is about the largest size range that should be attempted.

This leads us to the fact that we must generally stock a number of sizes separately and be able to blend them back together for loading, a factor which seriously limits the design of a system.

Abrasiveness of the material being handled will have some effect on your choice of a system. A very abrasive rock such as granite will make for short cable life with any scraper system where the cables ride on the rock. Bucket maintenance also becomes a larger factor in such a rock, but belt conveyors are little affected.

Another fact to be kept well in mind is that these large piles will probably not be handled more often than once or twice a year. Thus the equipment for them may well be idle for long periods of time. This argues against the use of machines which require skilled operators. For example, when you put a clamshell crane to work, you soon find that the skilled operator and helper want to regard it as their right to stay with the crane at all times whether or not there is work for it to do. In contrast, a simple drum hoist scraper can be operated by almost anyone about the plant and can be covered with a canvas and forgotten when not in use.

Increase Stock to Seven Sizes

A brief description of the Consolidated Quarries storage system at Rock Chapel is given to illustrate some of the problems mentioned.

Rock Chapel averages 200 tons per hour of crushed granite production. The screening tower is on top of two rectangular concrete bins set on the ground and connected by a concrete partition wall. On each side and to the rear of this tower, there are storage conveyor galleries about 30 ft. above the ground. The side galleries are each about 100 ft. long, and each has one belt with a traveling tripper and one belt which discharges at the end.

The main loading out conveyor is in a concrete tunnel beneath the bins and rear pile. Recovery from piles on the sides is accomplished by two tunnel conveyors at right angles to the main loading out conveyor which dump onto it at an intermediate point. This system allowed the stocking of five different sizes for a total of about 30,000 tons but only about 15,000 tons was drawable onto the recovery conveyors without external aid. The idea behind this design was that all sizes could be drawn direct onto the main belt in limited quantities and that wing conveyors would be used only part time for excess stock when shipments and production were out of balance.

This system worked admirably at the start in 1929, but several serious faults in design have since shown up. We now find it necessary to stock seven sizes instead of five because of changed specifications. An excess of some 10,000 tons of one size may be accumulated over a year or more and

then that pile may vanish in short order with a large contract. Thus our system had to be expanded both in number of sizes handled and in quantities stocked. Extension of the conveyors to accomplish this did not seem practicable so we have gradually added two small portable cable scrapers and one ¾-yd. clamshell as auxilliaries to the conveyors. With these machines, the conveyor-established piles may be broadened substantially for greater storage, or "dead stock" entirely cleaned up by scraping in to recovery conveyors. The clamshell is often used to stock one size which is frequently marketed "straight" beside the tracks. This combination of methods seems to me a fairly good one. Low operating cost conveyors take care of a large proportion of tonnage handled while cheap machines move the less frequently needed portions.

Add Facilities to Return Stockpiled Material to Crushers

We yet lack good facilities for returning material from stockpiles to the crushing circuit, a feature which should be incorporated into any really good system. When markets demand an excess of smaller sizes, we return larger sizes from stock to the crushing circuit by means of trucks hauling from the loading out point to a belt conveyor ahead of the secondary crusher. This is necessary to keep stockpiles in balance in the absence of orders for larger sizes. Almost all of us find it desirable at times to recrush some of the larger sizes in stock.

A return conveyor and stockpile system is now being constructed between the screening tower and secondary crusher building. A conveyor from the screening tower will place any of the larger sizes into an open stockpile with about 1500 tons drawable. From this pile, a second conveyor in a concrete tunnel will feed back to the cone recrusher or to the belt now going to screens. Use of the clamshell crane with this pile will allow storage of considerable quantities of the larger sizes.

We quite soon discovered that recleaning after stocking was a necessity because of accumulation of dust layers. I believe a large part of this dust was made by movement of stone into and out of stock. Perhaps our Engineering Director, Mr. Goldbeck, of the National Crushed Stone Association, could make a few important tests that would let us know how many fines are produced by dropping various types of stones through various distances into stock.

At the recleaning screen, which was established at the loading point over tracks, we soon added rinsing sprays. A spreading device to reduce segregation as material is placed in cars was also installed. This combination ended a large part of our troubles with inspectors.

Large stockpiles are becoming more and more necessary because of the desirability of providing more regular work for operating crews, the increasing difficulties of getting labor for extra shifts, and because of changing market conditions causing wide fluctuations in shipments.

Crush Tough Granite

(Continued from page 42)

gates release any one or a blend of several stone grades from storage on to the tunnel belt conveyor for direct loading into cars.

Isolated Location Requires Special Fire Protection

A small stream has been dammed up for a water supply and 600 g.p.m. of water are pumped to the washing plant. This plant is remote from any metropolitan centers and has taken particular precautions against fire hazards by the installation of fire extinguishing equipment. Throughout the plant "grenade" fire extinguishers, manufactured by the International Fire Equipment Corp., are provided. They are small, thin glass containers, filled with a red extinguishing liquid chemical, and are stationed on the several electrical control panels on the lower levels of the plant. In case of fire, a grenade would be simply thrown at the flame. The bulb breaks and the liquid is scattered over the fire.

Similar bulbs are used in the tipples and other remote locations, but they operate automatically. The bulbs are held in place over the electric motors by fusible links which melt at about 150 deg. F. and drop the bulbs on the fire.

W. T. Ragland, vice-president, and E. U. Ragland, secretary-treasurer, designed the plant, which is under the managership of P. A. Wallenborn. R. C. Williams, formerly superintendent of the Woodleaf, N. C., plant of Raleigh Granite Co., is superintendent of the new plant. Other officials of the Superior Stone Co. are W. H. Ragland, president; E. B. Young, vice-president, and R. B. Shepard, sales manager.

Second Quarry Operated in Hard Blue Limestone

Superior Stone Co. also has built a new crushed stone plant at Kings Mountain, N. C., and a gravel plant at Dunn, N. C. The quarry at King Mountain is in a hard blue limestone, which is the only hard limestone ever worked in the central or eastern part of the state. Excavation in this quarry is carried on by a 2-cu. yd. Bucyrus-Erie shovel, using Mack trucks for haulage to the plant. This plant has a Traylor primary crusher, Symons secondary crushers, belt conveyors for intra-plant transportation and Tyler Ty-Rock and Symons vibrating screens.

Stripping is done with a ¾-cu. yd. Northwest shovel and stockpiling with a 1-cu. yd. Northwest crane. About 7 ft. of overburden has to be removed, and the deposit has been cored to a depth of 100 ft. The rock stands an excellent test for road work and yet requires no secondary shooting.

Gravel Plant

Gravel is produced from a 600-acre deposit, running about 55 percent gravel and containing practically no material over 2 in. A 1½-cu. yd. Diesel-powered dragline is used for excavation, with dump trucks delivering the material to a main belt conveyor feeding two 4- x 12-ft. Tyler Ty-Rock vibrating screens. Washed and sized material is stored in steel bins for truck loading, with a conveyor belt for car loading. A ¾-cu. yd. crane does the stock-piling.

Direct loading of dry stone by conveyor and a chute from the conveyor gallery

Potassium Sulfate In Cement Clinkers

By G. L. KALOUSEK, C. H. JUMPER

and J. J. TREGONING*

Aqueous solutions filtered from mixtures of ground portland cement clinker and water were analyzed chemically for the various constituents of the clinker. The amounts of alkalies and sulfate that dissolved were found to differ widely among the 12 clinkers studied. Correlation of the amounts of K_2O and SO_3, both in the clinkers and in the aqueous solutions, indicated that K_2O is present in many clinkers partly as K_2SO_4, and this accounts for the large fraction of the total K_2O found in solution. The decreases, with time, in the concentration of the SO_4 of the solutions in contact with the hydrating clinker indicated that tricalcium sulfoaluminate was precipitated.

ADDITION OF WATER to portland cement clinkers results in a partial or nearly complete solution of the various constituent compounds. These solutions range in condition from unsaturated to super-saturated with respect to different compounds such as the aluminates, silicates, sulfates and the hydroxides of calcium, potassium and sodium. In contact with the hydrating clinker they establish to a considerable extent the conditions under which the reactions of setting and hardening occur. The alkalies, the content of which for American clinkers averages about 0.75 percent, because of their high solubility affect the compositons of the solutions, particularly by decreasing the solubility[1] of calcium hydroxide. The compositions of the solutions doubtlessly have a profound effect on the reactions of setting and hardening. It has generally been believed that the alkalies are present in clinkers as aluminates or silicates which hydrolyze rapidly, yielding NaOH and KOH in solution.

CHEMISTS' CORNER

Reports of investigations in the rock products industries and comments on articles appearing in these columns are invited, as this is the purpose of the "Corner."

In an extensive investigation at this Bureau on the compositions and properties of solutions obtained from clinker pastes, with and without admixtures, the percentage of the total K_2O and Na_2O which is dissolved was found to vary extensively among the clinkers. In general, the results of chemical analyses of solutions which result from the action of water on a mixture of compounds are not sufficient in themselves for identification of the original compounds. These data, however, were of such a nature as to permit the conclusion that part of the potassium is present in many cement clinkers in a compound not considered previously. Because of this, and of the increasing interest in the alkalies, the results pertaining to K_2O and Na_2O are presented here as a separate publication. The remainder of the data will be published later.

Materials and Procedure

Twelve commercial portland cement clinkers consisting of eight of the standard, three of the modified, and one of the sulfate-resistant type were ground to an average fineness[2] of 1800-1900 sq. cm. per gram. As shown by the analytical results in Table 1, the percentages of K_2O and Na_2O varied through a wide range for these clinkers.

Paste, made by mixing 7000g. of ground clinker and 2450g. of water

* Representing National Bureau of Standards, Washington, D. C.

TABLE 1: PERCENTAGES OF K_2O, Na_2O AND SO_3 IN CLINKER; GRAMS PER LITER OF K_2O, Na_2O AND SO_3 FOUND IN SOLUTION, AND PERCENTAGES OF TOTAL K_2O AND TOTAL Na_2O THAT ENTERED SOLUTION FROM HYDRATING CLINKER

No. Clinker	Percentage of clinker			g.K_2O/liter found in solution at:		g.Na_2O/liter found in solution at:		g.SO_3/liter found in solution		Percentage of total K_2O found in solution at:		Percentage of total Na_2O found in solution at:	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	K_2O	Na_2O	SO_3	7 min.	2 hr.	7 min.	2 hr.	7 min.	2 hr.	7 min.	2 hr.	7 min.	2 hr.
1.	0.05	0.56	0.09	0.02	0.09	0.072	0.586	0.002	0.002	1	6	0.4	3.8
2.	0.25	0.04	0.00	0.429	0.956	0.133	0.194	0.004	0.006	6	14	12	18
3.	0.11	0.02	0.01	0.280	0.309	0.062	0.071	0.004	0.004	9	10	10	12
4.	1.32	0.09	0.51	18.65	19.71	0.481	0.790	7.900	3.348	50	52	19	31
5.	1.05	0.05	0.37	13.21	15.08	0.106	0.166	2.811	0.134	44	50	8	12
6.	0.53	0.62	0.18	5.99	7.22	2.20	3.37	0.804	0.058	40	49	12	19
7.	0.18	0.18	0.32	2.84	3.20	1.26	1.57	0.019	0.000	56	62	25	31
8.	0.20	0.17	0.30	3.35	3.48	1.47	1.66	0.007	0.005	58	61	30	34
9.	0.09	0.87	0.35	0.352	0.352	2.99	3.89	0.000	0.003	14	14	12	16
10.	0.26	0.13	0.12	1.45	1.83	0.244	0.344	0.009	0.019	20	25	7	9
11.	0.37	0.43	0.12	3.23	3.48	1.79	1.97	0.019	0.010	31	33	15	16
12.	0.76	0.12	0.28	10.73	11.66	0.449	0.505	0.024	0.027	49	54	13	15
										15 min.	—	15 min.	—
A	0.58	0.35	0.23							43	—	18	—
B	0.47	0.27	0.17							45[1]	—	20[2]	—
C	0.74	0.51	0.37							70[1]	—	20[2]	—

[1] Estimated. [2] It is assumed that 20 percent of Na_2O dissolved.

for 2½ minutes, was placed in a specially constructed air-pressure filter and the solution removed by the application of compressed air. The filter consisted of heavy brass tubing, 10 in. in diameter, to which was securely attached a base-plate perforated with holes 1/16 in. in diameter and spaced ¾-in. apart. The filtering media, placed in the following order on the perforated base, were first a filter paper, next a No. 150 screen cloth, then another filter paper and finally a No. 8 screen cloth. The iron cover plate, with accompanying rubber gasget and connection to the air line, was fastened to the filter drum collar with steel stud bolts. Air pressure was applied initially at 25 p.s.i. and increased at the rate of about 12 p.s.i. per min. to 75 p.s.i. The time required for filtering generally varied from 2 to 4 minutes. Clear solutions were obtained from all clinker pastes. One paste of each clinker, or clinker plus admixture, was filtered immediately upon completion of mixing with water. The time elapsed from addition of the water until completion of the filtering averaged seven minutes. A second corresponding paste was permitted to stand for 1 hour and 55 minutes after completion of mixing and then filtered as the first. The total time of contact of hydrating clinker with water averaged two hours for the second paste.

The solutions were analyzed according to accepted analytical methods for all constituents of the clinker. An error of only 0.01 or 0.02 percent absolute, in the analytical results, for K_2O, Na_2O or SO_3 in clinkers which contained these in small amounts, alters markedly the calculated values reported in Tables 1 and 2. Therefore, all precautions were observed and duplicate or triplicate determinations of these constituents were made. Blank determinations were made and appropriate corrections were applied.

Results and Discussion

Only the salient data pertaining to the alkalies are presented in this paper. In Table 1, columns 2, 3 and 4, are reported the percentages of K_2O, Na_2O, and SO_3 in the clinkers. In columns 5 and 6, and 7 and 8 are given, respectively, the grams per liter of K_2O and Na_2O that were found in solution at seven minutes and two hours; and columns 9 and 10 show the grams per liter of SO_3. Columns 11 and 12, and 13 and 14 contain the calculated percentages of the total K_2O and Na_2O in the clinkers that dissolved in the two periods.

An examination of the data in columns 11 and 12 shows that 1 to 58 percent of the total K_2O present, and from less than 1 percent to 30 percent of the total Na_2O present dissolved in seven minutes. The consistently high percentage solution of K_2O from a number of the clinkers permits a division of these results into two groups. Thus, clinkers 4, 5, 6, 7, 8 and 12 contain readily soluble K_2O, 40 to 58 percent of the total amount present going into solution in seven minutes, and although clinker 11 shows only 31 percent it is included in this group. The fraction of the total Na_2O that was removed is seen to be generally much lower, varying from 8 to 30 percent. Clinkers 1, 2, 3, 9 and 10, of the second group, show only a 1 to 20 percent solution of K_2O. It is to be noticed that, with the exception of clinker 10, in this group the percentages of total Na_2O and K_2O that dissolved are, within limits of experimental error, nearly the same for any given clinker.

TABLE 2: MOLES K_2O FOUND, AND MOLES SO_3 CALCULATED PER LITER SOLUTION

Clinker No.	Moles per liter Solution K_2O in solution at 7 min.	SO_3 available in clinker
4	0.197	0.182
5	0.140	0.132
6	0.054	0.064
7	0.030	0.114
8	0.036	0.107
11	0.035	0.043
12	0.114	0.100
A	0.089	0.096
B	0.097	0.027
C	0.164	0.136

An examination of the data shows that the solution of the alkalies between seven minutes and two hours, for both groups of clinkers, is relatively slow, the average increases of K_2O and Na_2O being, respectively, 4½ and 5 percent. From the data in Table 1 it is also apparent that the factors governing the solubilities of these two constituents differ among the clinkers, indicating a variation of the manner in which K_2O and Na_2O, respectively, are combined in the clinkers. No correlation could be found between the amounts of Na_2O or $Na_2O + K_2O$ and SO_3, nor between other constituents in the clinkers or in the solutions. However, as discussed below, five of the seven clinkers in this study which contained the readily soluble K_2O showed a correlation between the SO_3 and K_2O contents.

As shown in Fig. 1, wherein are plotted the percentages of SO_3 against the percentages of K_2O in the clinkers, the SO_3 content of the eight clinkers having more than 0.3 percent K_2O bears nearly a straight line relationship to the K_2O content. Three of these points (A, B and C) are taken from Roller's data.[3] This straight line relationship, the slope of the curve corresponding to a molar ratio of 2.1 K_2O:1.0 SO_3, is very striking because five of the six clinkers for which that data are available contain potash of which 50±10 percent dissolved in seven minutes. The sixth clinker (No. 11) shows 31 percent loss of K_2O. Clinkers B and C, for which complete data are not available, show respectively an estimated 45 and 70 percent solution of K_2O. The presence of K_2O and SO_3 in a molar ratio of 2.1:1.0, together with the fact that approximately half of the total K_2O dissolved in seven minutes, indicates the possibility that about half of the K_2O content of these clinkers may be present as K_2SO_4. Such an assumption is made and the data are considered on this basis.

One might therefore expect that the K_2O and the SO_3 would be present in solution in a molar ratio of 1:1. Since the amounts of SO_3 in solution were less than those required for the K_2O, and in most instances practically nil, a possible reaction involving this constituent must be considered. It has been established [4, 5, 6, 7, 8, 9] that a nearly insoluble sulfoaluminate of calcium is precipitated from solutions containing aluminates, $CaSO_4$ and $Ca(OH)_2$. The compositions of such solutions after reaction approximate the compositions of solutions originating from the action of water on alkali-free cements. From these observations and other considerations it is generally believed that tricalcium sulfoaluminate is formed in cement pastes. It has also been shown[9] that the presence of alkali sulfates in suspensions of clinker and water results in the formation of this double salt. The disappearance of the SO_3 from solutions in this investigation is attributed to the formation of the sulfoaluminate according to the reaction*:

$$3\,CaO.Al_2O_3 + 3\,K_2SO_4 + 3\,Ca(OH)_2 + 31H_2O = 3\,CaO.Al_2O_3.3\,CaSO_4\,31H_2O + 6\,KOH.$$

The $Ca(OH)_2$ originates from $3CaO.SiO_2$ by hydrolysis, and from solution of any free lime in the clinker. The assumption that this reaction is operative is supported by a consideration of the ionic balance in the solution. As the $\overline{SO_4}$ disappears from solution in the interval between seven minutes and two hours the $\overline{OH}$

*The formula for the trisulfate form of the sulfoaluminate is inserted in this equation according to most views. Recently, evidence [1, 10] has been advanced indicating that the monosulfate form of the salt is formed in cement pastes.

concentration increases. This increase in the $\bar{O}H$ concentration may be balanced against the decrease in the $\bar{S}O_4$ concentration as indicated in table. To illustrate the changes in the concentrations of the various ions the data for solutions from clinker 4 are given in the following table:

CONCENTRATIONS IN EQUIVALENTS PER LITER

	$\frac{1}{2}Ca^{++}$	K^+	Na^+	$\bar{O}H$	$\frac{1}{2}\bar{S}O_4$
7 minutes	0.008	0.396	0.015	0.213	0.197
2 hours	0.007	0.419	0.026	0.358	0.084
Change	—0.001	+0.023	+0.011	+0.145	—0.113

The observed increase in $\bar{O}H$ concentration is 0.145 equiv./1 and the observed decrease in $\bar{S}O_4$ is 0.113 equiv./1. There remains an excess of 0.032 equiv. of $\bar{O}H$ to be accounted for. The precipitation of 0.001 equivalent of Ca^{++} as $Ca(OH)_2$ resulting from supersaturation with respect to the latter caused a loss of 0.001 equivalent of $\bar{O}H$. A simultaneous hydrolysis of the compounds of K_2O and Na_2O could readily account for the remainder of $\bar{O}H$ in this summation, since the appearance of Na^+ and K^+ in the solution would be accompanied by equal equivalents of $\bar{O}H$. In the cited case the K^+ and Na^+ together total 0.034 equiv./1 which is the amount, within the limits of experimental error, required for a balance under the assumed conditions. A similar balance holds for the solutions from clinkers 5 and 6. For the remainder of the solutions the $\bar{S}O_4$ content was so low at seven minutes that the changes in the interval between seven minutes and two hours were within experimental error. The data from these solutions do not invalidate the deductions drawn for the solutions enumerated above, since the virtual disappearance of $\bar{S}O_4$ from solution may have occurred during the first seven minutes.

Calculations based on the assumption that K_2O was dissolved as the sulfate in seven minutes (or less) from clinkers containing readily soluble K_2O are presented in Table 2. In column 2 of this table are given the moles of K_2O per liter solution; and in column 3 are given the moles of SO_3 which would be found per liter of solution if all SO_3 in the clinker dissolved and none precipitated. The agreement between moles of K_2O and SO_3 is considered excellent for eight of the ten clinkers listed because, first, the K_2O found in solution may, in part, originate from other compounds than K_2SO_4 and, secondly, small absolute errors in the determinations of SO_3 in the clinkers would alter markedly the moles of SO_3 reported in the table. Clinkers 7 and 8 are the only slag clinkers included in this study and because of their large molar excess of SO_3 over the K_2O (see Fig. 1) they cannot, of course, show this agreement. It is interesting to note that these two clinkers give the highest percentage of total Na_2O in solution and also contain sulfite and thiosulfate. Total alkalies were reported for solutions from clinkers B and C, and it was assumed that 20 percent (a representative amount) of the total Na_2O dissolved. Although the moles of K_2O reported might be altered somewhat if the true amounts of Na_2O were known, the results as calculated definitely approximate a close relationship between the K_2O and SO_3.

The above correlation between moles of K_2O and SO_3 for the greater number of the clinkers containing readily soluble K_2O supports the assumption that K_2O in the clinker is combined partly as K_2SO_4 and as such is readily soluble.

In an attempt to determine directly the presence or absence of K_2SO_4 in clinker specimens, small pieces of clinker 4 were selected, crushed to a fine powder, immersed in a liquid of suitable index of refraction and examined with the polarizing microscope. The recorded optical properties of crystalline K_2SO_4 are as follows[11]: $\alpha = 1.497, \beta = 1.495, \gamma = 1.494, 2V(+) = 67$ deg. A liquid of index 1.52 was selected because sulfates of calcium have indices of refraction equal to, or higher, than this value. In this liquid small discrete grains were observed which had very low double refraction and indices of refraction considerably lower than the liquid. In these properties the grains correspond with K_2SO_4. Attempts to identify this material in a liquid of the mean index of K_2SO_4 were inconclusive because of the small amount of the material. However, there is no known constituent of portland cement clinker other than K_2SO_4 which has indices of refraction lower than 1.52.

It is concluded that K_2O is probably combined in many clinkers partly as K_2SO_4, and as such is readily soluble.

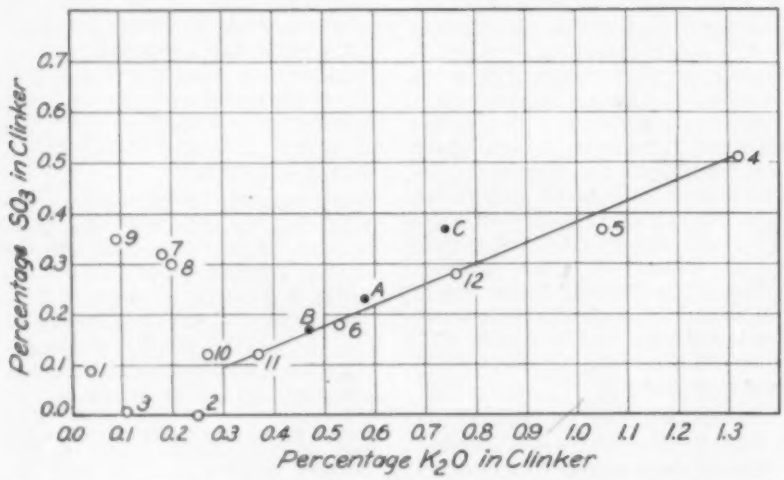


Fig. 1: Percentage SO_3 in clinkers plotted against corresponding percentage K_2O in clinkers

ACKNOWLEDGEMENTS

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REFERENCES CITED

[1] Foren: **Symposium on the Chemistry of Cements**, Stockholm, 1938, p. 298.

[2] Wagner: **Proc. Am. Soc. Testing Materials, 33, II.** 553 (1933).

[3] Roller: **Ind. and Eng. Chem.**, 26, 669 (1934).

[4] Candlot: **Bull. Soc. Encour. Ind. Nat.** 89, 682 (1890).

[5] Kuhl: **Prot. Ver. Deut. Port. Zem. Fabr.**, 45, 98 (1922).

[6] Koyanagi: **Zement**, 20, 1016 (1931).

[7] Bogue and Lerch: **Ind. and Eng. Chem.** 26, 837 (1934).

[8] Klein and Phillips: **Techn. Pap. BS** 43 (1914).

[9] Shelton: **Ind. and Eng. Chem.** 18, 854 (1926).

[10] P. Schlapfer: **Symposium on the Chemistry of Cements**, Stockholm, 1938, p. 270.

[11] Winchell: **Microscopic Character of Artificial Minerals**, p. 217 (1931).

Safety Contest That Works

Employes earn bonus based on number of accident-free hours worked and are penalized for accidents due to carelessness

By J. V. OWENS*

FACED WITH THE PROBLEM of conducting a practicable and workable safety program, Eastern Rock Products, Inc., Utica, N. Y., worked out a plan the past year that is simple and effective.

Two sand plants, one gravel plant, two quarries, one agricultural limestone plant and one asphalt road mix plant are operated. These plants are all within a radius of 40 miles from the home office, and during production periods between 100 and 150 men are employed.

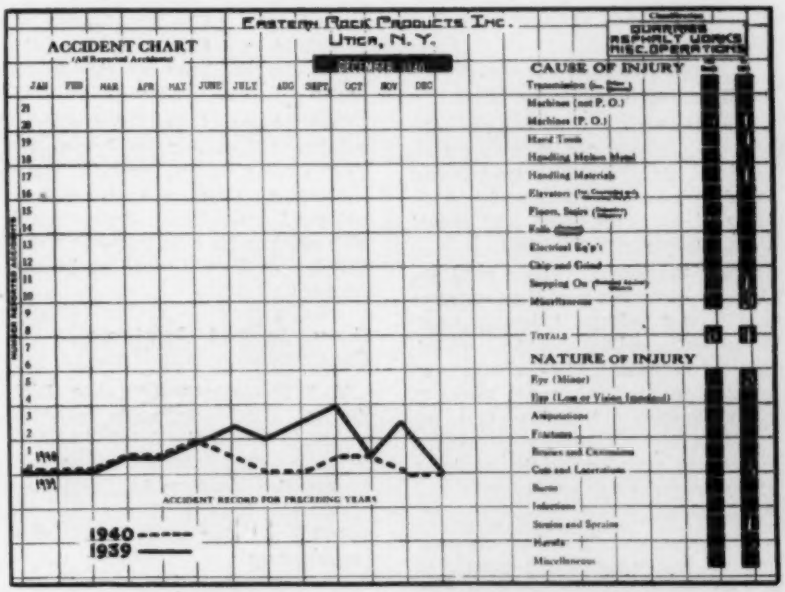
Owing to a limited payroll, it has been impracticable to self-insure, so our compensation insurance has been carried by a mutual insurance company. As compensation rates and the number of employes varies from plant to plant, depending on the nature and size of the operation, it has been virtually impossible to carry on an inter-plant safety competition. During 1939, however, we sponsored an inter-plant competition. While the results for the year were good, we felt that a permanent competition of this kind could not hold down accident frequency as the interest among employes fell off and there was a lack of fair competitive groups from the standpoint of size and variables in occupation hazards.

This problem was brought before a meeting of our superintendents who get together each month to handle problems of this type. A committee was set up to handle this problem, and in coöperation with the organization as a whole, was able to form a safety policy which to date has produced excellent results. Note the comparison of our accident record for the years 1939 and 1940 shown in the chart drawn up by our insurance carrier.

The contest was placed before the men in the following form:

The purpose of the contest is to make every worker safety conscious, and to encourage him to be constantly on guard, in the carrying on of his duties, against any act of carelessness or neglect which might cause injury to himself or to a fellow worker. Remember always that the right way is the safe way.

HOWEVER — AND THIS IS IMPORTANT—Every accident, however slight, must be reported to your superintendent. Leave it to him to decide whether or not it rates a regular report on an accident form, or whether medical attention is required. Do not conceal any injury, however slight, for fear that it will count against your record. There are many minor accidents which are no person's fault. Some plants are more liable to these than others. The Safety Committee does not want to penalize any worker unjustly.



Accident chart kept for each plant in safety contest which gives a monthly and cumulative record of all types of accidents

Awards and Penalties

The management of Eastern Rock Products, Inc., approves this contest and will pay to employes the sums awarded to them by the judges. Otherwise, the management has no part or voice in it. Superintendents of those plants having men contesting make up the Safety Committee. They planned the contest, and will act as judges. Their decision in any disputed decision or in settling any misunderstanding shall be final.

Each employe will start the contest April 29, 1940, with ZERO and each week his safety hours will be posted opposite his name on the bulletin board.

When an employe has worked a specified number of hours without an accident, he will be rewarded as per schedule below.

500 hours	$1.00
1,000 hours	1.00
2,000 hours	2.00
3,000 hours	3.00
4,000 hours	4.00
5,000 hours	5.00
6,000 hours	5.00
7,000 hours	5.00
8,000 hours	5.00
9,000 hours	5.00

10,000 hours $5.00 plus bonus of $20.00
Total amount possible to earn $61.00

For each additional 1000 hours he will receive $5. A bonus of $20 will be paid for each consecutive 10,000 hours.

This contest will remain in force year after year, and a man's safety hours will carry over from one year to the next.

* Eastern Rock Products, Inc., Utica, N. Y.

No. 1—An accident requiring medical attention but resulting in no lost time. FINE of 500 HOURS to EMPLOYE.

No. 1A—The plant superintendent may excuse the 500 hours penalty if in his judgment the causes of the accident are entirely beyond the injured worker's control.

No. 2—An accident resulting in lost time. FINE of 1000 HOURS to EMPLOYE.

No. 3—Failure of an employe to report an accident will result in the fine corresponding to the type accident plus an additional 1000 hours.

No. 4—An employe found to be responsible for an accident to another employe will be fined the same number of hours that the injured man is fined.

Good Accident Record Reduces Insurance Rate

The company pays compensation insurance on its employes at a rate fixed by the State Insurance Board based on past experiences with accidents in all stone, sand and gravel plants throughout the State.

When the company has a good accident record for a year the insurance cost is reduced the following year. When we have a bad accident record, the cost is greater. If we continue to improve our accident record, then our insurance costs will continue to be reduced, and the company can afford to pass the saving on to the employes who work safely and make this contest a success.

At the present time the company has an insurance credit rating of 31.2 percent which is considered very good in this industry. If we continue to improve our safety record, we can obtain a better rating.

If we have a continued bad record, we lose our credit rating and are then charged. Continued charges will make this contest impossible.

The contest is set up on our insurance credit rating and will be started at 25 percent instead of 31.2 percent. By keeping our record above 25 percent and trying to better our present rating, the employes will benefit by the payments in the contest as described.

If the employes fail to observe safety measures and the rating falls below the 25 percent mark, the company stands to lose and for each 1 percent decrease from the 25 percent mark the employes will lose 4 percent of the awards in the contest.

Superintendents are not included in the Safety Contest, but will act as judges.

During the year 1940, our men worked 164,707 man hours and suffered no lost time accidents. Our cost of premiums paid out to our employes was $152. The maximum premium payment for the above man hours worked would be less than $800, assuming that all employes had perfect records in excess of 5000 man hours. Our savings each year providing our present high level of safety is attained, are many times this amount. If this record is not attained our premiums to the men are reduced as explained in the contest rules.

It is very evident that all men keep close watch of their progress in this contest from their accumulative record posted each week for their benefit and observation. Premiums are paid promptly the day they are earned. The plant bill boards are getting a great deal of attention which has not been the rule in the past.

The company is not faced with the problem of stirring up competitive spirit among various groups or plants nor urging on men or groups who are not good competitors. Each man is interested in his own personal record and derives direct benefit for his safe conduct.

Government Agstone Contracts

U. S. DEPARTMENT OF LABOR, Division of Public Contracts, awarded contracts for agricultural limestone totalling $2,831,668.66 during the week ended January 25, 1941. Sizes of the individual contracts were indefinite, with the following concerns participating:

*Contractor
†Source of Supply
Delivery, Sept. 30, 1941

*Tamworth Associates, Inc., Needham Heights, Mass.

Delivery, Nov. 30, 1941

*†Chewacla Lime Co., Salem and Chewacla, Ala.
*†Gager Lime Mfg. Co., Sherwood, Tenn.
*†Dolcito Quarry Co., Birmingham and Dolcito, Ala.
*†Tinney Quarry Co., Talladaga, Ala.
*†American Limestone Co., Knoxville and Mascot, Tenn.
*†Marianna Limestone Co., Marianna, Fla.
*†J. B. Patterson, Lacon, Ala.
*†Lauderdale County Soil Cons. Ass'n., Inc., Florence, Ala.
*†Thompson & Grimwood, Huntsville and Normal, Ala.
*†William J. Lee, Laudersville and Moulton, Ala.

Delivery, Feb. 6, 1941

*†The Carborundum Co., Niagara Falls, N. Y.

Delivery, Dec. 31, 1941

*†Erwin Lanning, Marion, Iowa
†Dr. Vincil Janes Farm, DeKalb Co., Iowa
*†Lime Products Co., Sedalia, Mo.
*†Fort Scott Hydraulic Cement Co., Fort Scott, Kan.
*†Riverview Stone & Material Co., St. Louis, Mo.
*†A. W. Boenker, Robertson and St. Charles, Mo.
*†William Harris & Son, Patterson and Piedmont, Mo.
*†C. E. Cobb, Patterson, Mo.
*†John R. Burton, Montgomery City, Mo.
*†D. L. Word, Willard, Mo.
*†Donald F. Butler, Palmyra, Mo.
*†Auxvasse Quarry Co., Auxvasse, Mo.
*†C. C. Wines, Salem and Max, Mo.
*†W. L. Schwartz, Salem, Max and Lecoma, Mo.
*†Andrew County Lime Co., Savannah, Mo.
*†Stephens Quarry, Silex, Mo.
*†Weber Dehn Const. Co., Marshfield, Mo.
*Russell Burton, Huntsville, Mo.
†Ferguson, Roanoke, Mo.
*†Wm. Harris & Son, Patterson and Piedmont, Mo.
*†Hunt-Bullard Limestone Co., Osceola, Mo.
*†Raymond See, Montgomery City, Mo.
*†George Adams, Ashley, Mo.
*†Gordon C. Dunn, Middletown and High Hill, Mo.
†Earl Cockrum, Martinsburg, Mo.
*†Myron Baker, Independence, Iowa, and Kahoka, Mo.
*†Semo Lime Co., Patterson and Williamsville, Mo.
*†E. L. Warner, Ottawa, Kan.
*†Ross Parnell, Halltown, Mo.
*†Independent Gravel Co., Carthage, Phoenix, Collins and Joplin, Mo.
*†Buckman and Cullifer, Lakenan, Mo.
*†Victor Threlkeld, Shelbina, Mo.
*†Concrete Materials and Construction Co., Henry Co., Wayne Co., Western and Cedar Rapids, Iowa
*†Dewey Portland Cement Co., Davenport and Linwood, Iowa
*†Ray G. Cuff, Portage, Wis.
*†Rio Lime Works, Rio, Wis.
*†Kutz and Valstad, Poynette and Columbus, Wis.
*†A. W. Gallagher and Son, Madison, Wis.
*†Allie Holtshopple, Monroe, Wis.
*†Russell Carter, Juda, Wis.
*†Thornton Quarries Corp., Thornton, Ill.
*Walter Gudeman, Monon, Ind.
†The Monon Crushed Stone Co., Monon, Ind.
*George T. Brown, Winamac, Ind.
†The France Limestone Co., Logansport, Ind.
*Amza Barton Trucking Co., Bluffton, Ind.
*Fred Busick, Bluffton, Ind.
*Howard Habig & Sons Trucking, Bluffton, Ind.
†Meshberger Stone Co., Linngrove, Ind.
†France Stone Co., Bluffton, Ind.
*†The Erie Stone Co., Indianapolis and Bluffton, Ind.

Unions' Dispute Raises Stone Prices

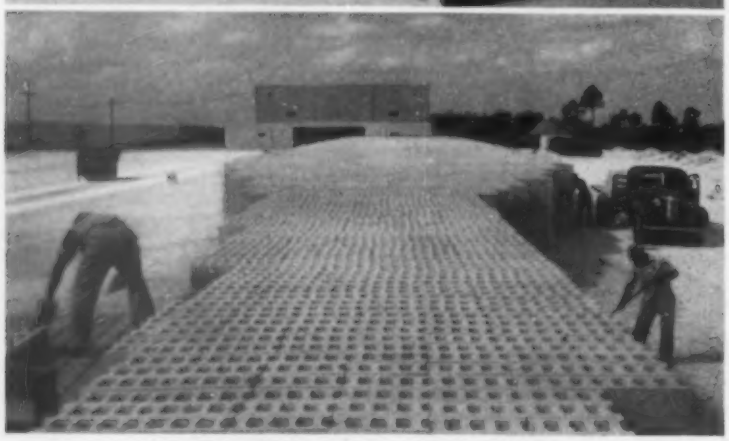
A DISPUTE between AFL and CIO unions is forcing a contractor who is paving a new super-highway in St. Louis county, Missouri, to purchase crushed limestone in Illinois for an added cost of $10,500, according to the *St. Louis Post Dispatch*. Stone is purchased for 95c per ton plus 66c transportation where quarries in St. Louis county quoted 80c plus 28c transportation. The contractor was unable to take advantage of the lower price because he has an agreement to employ AFL labor and his workmen will not handle or work with CIO produced materials. The contract involves 20,000 tons of limestone which logically would have been produced by local quarries under normal conditions. The State of Missouri might be asked to stand the extra expense on the grounds of "unusual circumstances."

CONCRETE PRODUCTS AND CEMENT PRODUCTS

MAKING BLOCK IN PIPE PLANT

Concrete pipe manufacturer installs completely automatic block plant . . .

Storage yard and plant of Independent Concrete Pipe Co., Lockport, Ill., which recently started manufacturing concrete block



STOCK YARD WITH 150,000 BLOCKS

Maule Industries of Miami, Florida (plants at Ojus), chose Besser Super Automatic Vibrapacs to meet increased production demands due to extensive building programs in Miami and surrounding area. They installed one Vibrapac last spring and now have a second one of the same model to provide for the still greater demand for Superior Quality blocks which Besser Vibrapacs produce.

The trend the country over is toward Besser Plain Pallet Vibrapacs and Besser Plain Pallet Tampers for increased production (100% Automatic Machines)—Greater Economy (Saving in pallet cost and saving in production cost)—A Better Product (Fully Pressed Top Units).

Eight models—Vibrapacs and Tampers—A capacity for any size plant.

Write for New Illustrated Catalog

BESSER MANUFACTURING CO., ALPENA, MICH.

THE SAVING IN PALLET COST PAYS FOR A BESSER PLAIN PALLET VIBRAPAC

View of completely enclosed batching plant. Bulk cement is unloaded from railroad cars in foreground. Aggregates are received in hoppers on another siding, shown at the extreme right, and elevated to plant on the long conveyor

Concrete For War Industry

Set up batching plant with 200 cu. yd. per hour capacity, and use 5-cu. yd. mixer trucks to deliver concrete for construction of ordance plants

OVER 200,000 CU. YD. OF CONCRETE will be required in the construction of the Kankakee Ordnance and Elwood Ordnance plants now being

One of the 5-cu. yd., Diesel-powered truck mixers leaving batching plant. Trucks operated at below zero temperatures

built by the War department near Wilmington, Ill. Probably a third of this yardage will go into the construction of reinforced concrete igloos for war materials storage.

Contractors for the two projects are the Stone and Webster Engineering Co. and the Sanderson and Porter Co., and all the concrete is being furnished by the U. S. Transit-Mix Concrete Corp. from a centrally-located batching plant and in ready-mixed concrete trucks.

U. S. Transit-Mix Concrete Corp., an affiliate of the McCormack Transit Mix Concrete Co., New York City, is a separate corporation which operates outside the metropolitan New York area on large projects. The New York concern has pioneered the idea of moving plants, equipment and personnel to distant locations, as contrasted to the limited area over which the established ready-mixed concrete company operates.

Preliminary to shipping machinery and equipment, officials of the company visited the site, explored the local sources of aggregates supply and became acquainted with the demands, transportation facilities and living conditions. With the tremendous migration of workers into that part of Illinois, key men and their families had to be provided for. The subcontract for the concrete will be completed in approximately one year from the first pouring in December, 1940.

Having determined the requirements and other factors, a complete concrete batching plant of 200 cu. yd. capacity per hour was shipped to the site from New York, N. Y., and located midway between the two projects. This plant, manufactured by the Butler Bin Co., consists of a 150 cu. yd., 3-compartment steel bin and a 6-cu. yd. weigh batcher with a 4-beam scale. Supplementing this plant is a new belt conveyor to transfer aggregates direct from hopper-bottomed cars into the bin and a new 500-ton bulk cement storage bin.

Aggregates, consisting of gravel in two sizes and concrete sand, are

Truck mixer leaving the plant with a load. Thirty transit mixers are used

Main storage bin for bulk cement. Screw conveyor removes cement from hopper into which bulk cement cars dump their loads, and also transports cement either from railroad cars or from the storage bin to the bucket elevator at the right. The elevator feeds either the storage bin or the concrete batching bin by means of overhead transfer system

shipped direct from stockpiles of the Chicago Gravel Co. plant at Rockdale, just southwest of Joliet, Ill. A 1½-in. top size gravel is specified for much of the construction and ¾-in. for the pouring of storage igloos.

Aggregates are dumped into a surge bin under the rails from which they are fed out through regulation bin gates onto a 36-in. belt conveyor, 40-ft. centers, which feeds either size of aggregate to the main conveyor—a 36-in. belt operating on 192-ft. centers. Both conveyors were manufactured by the Barber-Greene Co.

Need Plastic Concrete for "Igloos"

Cement delivered in standard hopper-bottomed bulk cement cars is dumped into a hopper from which a screw conveyor feeds out to an enclosed bucket elevator. This elevator fills either a 150-bbl. bin over the batcher or the 500-bbl. main storage bin which is located on the ground level. A horizontal screw conveyor from the bottom of the large bin to the bucket elevator is the means of transfer to overhead storage.

Both bins are partitioned for handling standard portland and high early strength cement, although practically all the concrete batched thus far is of standard portland. It is likely that some provision will be made later for the addition of a puzzolanic material to the mix. A very plastic mix, without the use of excessive water, is desired particularly in the construction of storage igloos. Freedom from pit holes and crevices is necessary in the storage of powder.

A supply of mixing water was lacking, but the contractors have driven two wells and provided a 25,000 gal. insulated water tank. Water flows by gravity from this tank to a 3-in. Chicago pressure pump in the plant which develops the necessary pressure for handling all the water requirements. This pump, which has a 3½-in. suction and 2½-in. discharge, is controlled automatically by a pressure switch to maintain the level in the water tank.

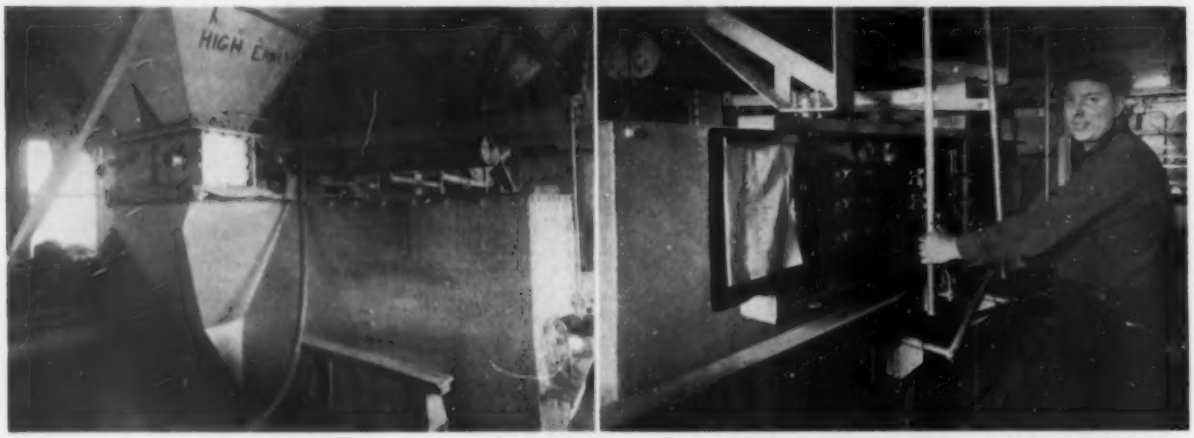
The plant is equipped to operate under any weather conditions, and has already dispatched concrete at 12 deg. F. below zero for continuous pouring by the contractors. It is entirely enclosed, and the batching floor and offices are heated by steam radiators.

Aggregates in the bin are heated by a combination of steam coils and live steam through jets, while the mixing water is heated up to 180 deg. F. by steam coils. An automatic electric control on the 212-gal. Butler water tank regulates the exact quantity of water per batch. Two steam boilers, one of 79-hp. and one of 50-hp., develop the steam for the plant requirements. A 2-cyl. 3½- x 5-in. Ingersoll-Rand air compressor furnishes the air needed to stimulate the flow of cement from both cement bins.

Concrete is delivered in a fleet of thirty 5-cu. yd. Jaeger transit-mixers on Mack Diesel-powered chassis. The average haul is 2½ miles. In some instances the concrete is mixed in transit, starting the drum revolving at the plant. On some pours the water is added at the forms, and all the mixing is done there under the contractor's supervision, and occasionally the drums are started enroute to the job.

In case of truck engine trouble, the defective motor is shipped back to New York for overhauling and is replaced at the Wilmington, Ill., plant from a stock of spare motors.

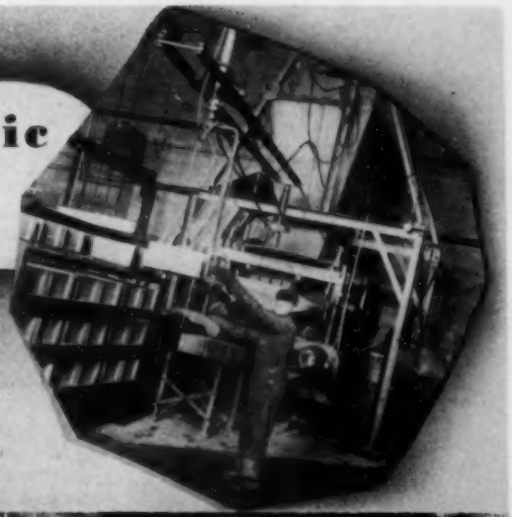
The design, construction and operation of the plant is under the general supervision of J. H. Dixey, vice-president, and F. M. Stewart, superintendent.

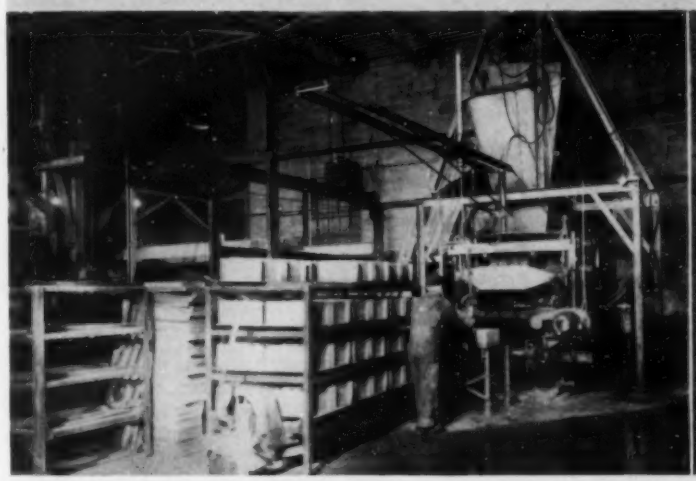


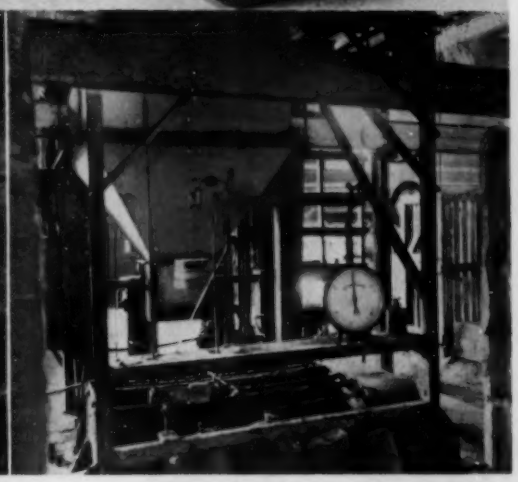
Left: Weigh batcher for aggregates, three-compartment bin above, and in the foreground are the spouts of two cement bins. Aggregate bins are piped for steam heating. Right: Bin gate controls and the four-beam scale for the 6-cu. yd. weigh batcher

Completely Automatic Block Plant

Aggregates batched out accurately by weight and transported by lorry to concrete mixer. Blocks are handled from block machine to racks by pneumatic off-bearer







Fully automatic vibrating block machine producing 500 8- x 8- x 16-in. units daily. In back of the curing rack that is being loaded is the blade mixer from which concrete is elevated by skip hoist to the hopper of the block machine

Above: Two block at a time are loaded onto racks with pneumatic off-bearer

Below: Two-ton weigh lorry for batching travels on overhead rails, serving mixers for pipe tamping machine, block machine and mixer for large pipe

CHICAGO'S POTENTIAL MARKET for concrete building units is being developed along with the establishment of well-equipped and efficiently operated plants.

One of the newest is the plant at Lockport, Ill., where the Independent Concrete Pipe Corp. of Indianapolis, Ind., has branched out into concrete masonry after seven years of making concrete pipe.

Sales are handled exclusively by one of Chicago's largest building supply dealers who has an aggressive sales force to handle the plant output of about 4500 8-in. standard units daily. Probably 90 percent of the plant capacity is trucked direct to jobs in Cook County.

All of the block are made with sand and gravel aggregates, available locally, which are received in side dump railroad cars from a siding alongside the plant. Since the original layout was designed for convenient expansion, very little change was needed to incorporate a block plant into the pipe plant other than an extension of the building.

The plant parallels the railroad tracks and comprises, from one end to the other; equipment to make large concrete pipe, a mixer and tamping machine to make from 6- to 30-in. pipe, and the block-manufacturing equipment. A single 2-ton Fairbanks, Morse weigh lorry receives aggregates from a single 5-compartment, 100-cu. yd. bin and is transferred on overhead rails to each of the three mixers.

Three Men Operate Plant

Concrete building units are manufactured by a complete Besser unitized plant, consisting of a 100 percent, fully automatic Besser "Vibrapac" block machine, a 40-cu. ft. blade mixer located on the floor level and a skip hoist and bucket to elevate the concrete to the machine. Ten 8- x 8- x 16-in. units per minute are cast three at a time on a single plain steel pallet. In a single cycle, six 4-in. units or two 12-in. units are manufactured.

The machine is set in operation by a push of the starter button, pallets are fed and oil-sprayed automatically, and a pneumatic off-bearer is used to place the units on the rack cars. Three men operate the plant; one to handle the off-bearer, a second to operate the mixer and a third to handle the racks of units into the curing kilns. There are 75 Chase racks, with a Lewis-Shepard hydraulic jacklift and a 6000-lb. Clark gasoline-driven Tructractor for handling the racks into the kilns and from the kilns to outside stockpiles. Yarding is done over concrete runways.

While there are some who question the value of manufacturing concrete block by vibration when heavy aggregates are used, the selection of a

vibrating machine was considered preferable for the aggregates used here.

High Block Yield With Sand and Gravel

Yield on the vibrating machine averages 25 standard 8- x 8- x 16-in. block per sack of standard portland cement, without sacrificing a reasonable margin of strength. Aggregate used is a ⅜-in. top size round gravel and a concrete sand that is coarse. Only 5 percent of the sand passes a 50-mesh sieve. Consistency is a semi-dry mix, the same as that used for machine-made pipe but wetter than would be desired for tamped block.

Aggregates are dumped from the cars into surge bins below the elevated track which adjoins the plant at the rear. Bin capacity is seven cars of material. The bins taper down to draw-off gates over a belt conveyor which transfers from a short belt to a bucket elevator. Live steam is introduced at the drawoff gates in freezing weather. Normally gravel comes in a No. 4 to 1-in. size and is screened into three sizes by a small vibrating screen over the bin. Cement is received in sacks which slide down a chute from the cars to the mixing floor on the ground floor of the plant.

Concrete sewer and culvert pipe are manufactured in sizes from 6-in. to 108-in. diameters. The smaller pipe, under 30-in. diameter, are made on a Turck-McKenzie tamping machine, which is fed concrete by a skip bucket from a 12-cu. ft. concrete mixer that receives aggregates from the common weigh lorry.

Transport Concrete for Large Pipe by Special Truck

Large pipe are manufactured in the yard from concrete batched and mixed in the plant. A 1-cu. yd. drum mixer in the plant is elevated on a permanent foundation to receive aggregates from the weigh lorry by skip bucket and to discharge into a truck fitted with a hopper feeding concrete to a short inclined belt conveyor. This is the arrangement used to pour large pipe, with the aid of Electric Tamper and Equipment Co. vibrators attached to the pipe molds. A single truck with 1-cu. yd. hopper is capable of pouring 50-cu. yd. of concrete a day. Pipe moved out of the curing kilns are yarded by a trailer pulled by a Caterpillar tractor. Big pipe and rings are handled by a Buckeye crane in the yard.

From top to bottom: 1—J. J. Loughlin, superintendent of the plant. 2—Tractor and trailer transports pipe from curing kilns to the storage yard. 3—Specially-designed, truck-mounted hopper and conveyor for pouring large pipe in the yard. 4—Pipe under 30-in. in diameter are made on this machine. 5—Moving a load of specials to the kilns for curing. At the left is the block machine mixer

Steam Curing Kilns

Seven steam curing kilns, each 20- x 100-ft. in area, are used. Four are for pipe, one for specials and two for concrete block. Man-hole units are manufactured on a Besser hand-tamp machine. The curing period under low pressure steam varies from 12- to 24-hr. depending upon the weather.

Practically all deliveries are made by truck but, on occasion, pipe are delivered by rail on long hauls. Independent Concrete Pipe Corp. operates other permanent concrete pipe plants at Mishawaka, Ind., Indianapolis, Ind., and St. Louis, Mo. J. J. Loughlin is superintendent of the Lockport plant.

Specify Concrete Units In Housing Project

CONCRETE BLOCK foundations were specified for the 100 houses in the Radford, Va., housing project. This is a beginning but does not include any masonry units above the foundation.

▪

A number of other housing projects have been announced by the federal government, but no details have been issued concerning materials. The Corpus Christi Housing Authority, Corpus Christi, Texas, has plans for 500 defense housing units; a 172-unit housing project for negroes at Charleston, S. C., has reached the bid stage; and a low bid of $625,000 has been received from Chalker and Lund, West Palm Beach, Fla., for the Tindall Heights project under the Macon Housing Authority, Macon, Ga.

New Block Plants

CARLTON COUNTY CEMENT BLOCK Co., Barnum, Minn., has been organized and has a new plant to manufacture sand and gravel concrete block. L. W. Rhoads and Mrs. R. L. Goodell are owners of the new company.

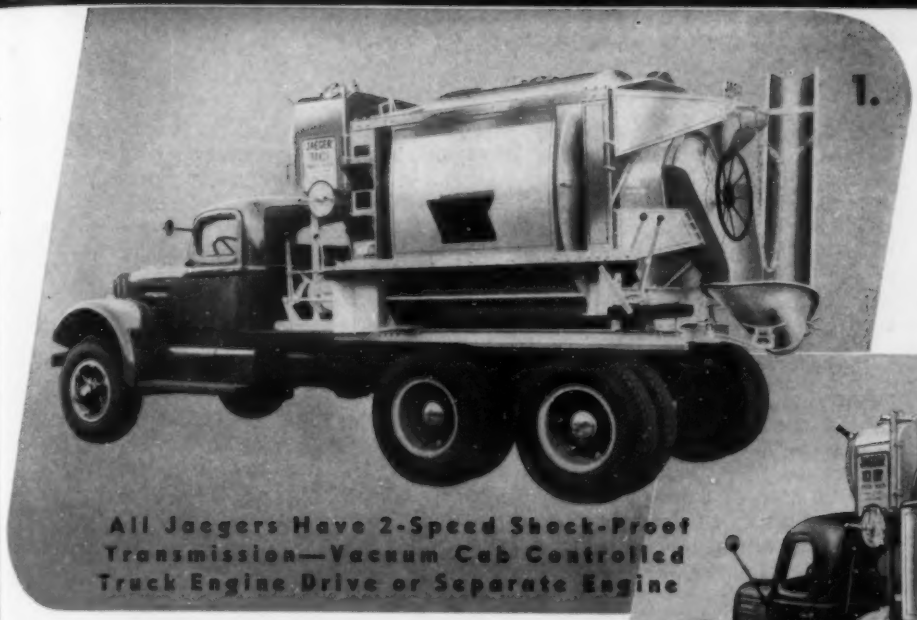
▪

POLO CEMENT PRODUCTS Co., Sterling, Ill., has started construction of a new building for the manufacture of concrete block.

•

MRS. VERA MAXWELL has erected a concrete block building on Wendago road, three miles southeast of Grand Rapids, Minn., where concrete blocks are being manufactured.

Only JAEGER Equips You to Meet EVERY Ready-Mix Demand



1.

All Jaegers Have 2-Speed Shock-Proof Transmission—Vacuum Cab Controlled Truck Engine Drive or Separate Engine

Standard LOW CHARGE

Type: Lowest, most economical to load; fastest on the market to mix and discharge — produce maximum daily yardage of proven higher strength concrete. Sealed drum meets any specification. Sizes 2 to 8 cu. yds.

2.

All 2 Yd. Models Mount to Advantage on Ford-Type Trucks

HIGH DUMP Types:

(2) Top Loading Models with "Sealed Drum"

(3) Or Combination Top and End Loaders (Pat'd)

Far outselling all other high discharge truck mixers today because they are fastest to load, mix and discharge any slump concrete — and are the only high discharge truck mixers that meet every specification and job condition.

"Sealed Drum" Models take full load in one quick drop through the top. Fast Vacuum-Controlled Discharge Door seals against loss of moisture and heat in winter concrete.

Jaeger End Loading Hopper Attachment (specially adapted to older or temporary plants not equipped for ribbon loading) offers many advantages over all other end loaders — and does not interfere with use of Top Loading Door where specified by engineers. (See details at right.)

Both types are built in 2, 3, 4 and 5 yd. sizes.

3.

Jaeger Charging-Discharging Hopper Attachment Permits Top or End Loading in Order to Meet Conditions - - -

The only end-loader which does not constrict drum opening and slow up charging and discharge. One quick turn of hand wheel opens Discharge Gate — no need to move entire Hopper (requiring many turns of a wheel) — no second seal to leak or wear.

JAEGER PORTABLE HOPPER

Saves Truck Mixers Waiting—Means 25% More Payloads per Day on Average Job. Tows to job behind truck mixer — takes full 2 or 3 yd. batches. One hopper serves almost any job.

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Send us newest information on ☐ Standard LOW CHARGE Truck Mixers, Agitators, ☐ HIGH DUMP Models, ☐ Portable Hoppers, ☐ Auto-Pavers and Spreaders, ☐ Pumps, ☐ Mixers, ☐ Hoists, ☐ Carts.

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Ideas For Better Concrete

American Concrete Institute papers point to the need for more fines in concrete, specifications based on strength, and a better understanding of ready mix measuring methods

APPROXIMATELY 400 engineers interested in concrete and its uses attended the 37th annual convention of the American Concrete Institute in Washington, D. C., February 18-20.

REAR ADMIRAL BEN MOREELL, Chief of the Bureau of Yards and Docks of the Navy Department, was elected president to succeed R. B. Young of Toronto, Canada. R. E. Davis of the University of California and M. O. Withey of the University of Wisconsin were elected senior and junior vice-presidents, respectively.

The opening papers, by P. F. Girard and V. E. Gunlock, dealt with the design and construction of Chicago's initial system of subways. For years many engineers maintained that Chicago's underlying stratum of soft, blue clay made a subway impossible; yet, today the first section is nearing completion. In the initial project, approximately 2,000,000 cu. yd. of excavation are involved, and nearly 1,000,000 bbl. of cement, 500,000 cu. yd. of stone or gravel, and 400,000 cu. yd. of sand will be used. Sand is obtained from Lake Michigan by sand suckers which hunt around until they find a source of supply which closely approximates the desired grading. Glacial gravel is being used in most of the underground structures while a crushed Niagara limestone is used in the surface structures.

More Fines in Concrete Aggregates for Turnpike

The quantity of fines present in concrete sand was given considerable attention in several of the papers presented. It has been found that increasing the material passing the 50-mesh sieve serves to increase workability and decrease bleeding. I. L. Tyler in his paper, "Concrete Control on the Pennsylvania Turnpike," stated that on this project a minimum of 10 percent passing the 50-mesh sieve was specified, and it was further recommended that where possible this minimum quantity be boosted to 15 percent. In a discussion of the above paper, Harold Allen of the Public Roads Administration described the procedure of concrete control in Kansas. He emphasized the importance of the grading of the aggregate, and suggested that specifications stipulate the fineness modulus of the sand along with the allowable ranges of percentages of material retained on each sieve size; 5 to 10 percent of the sand to pass the 50-mesh sieve has produced satisfactory results.

Control of Paving Mixtures

E. P. CAPE'S paper, "Design and Control of Concrete Paving Mixtures —In Texas," aroused considerable interest. Since 1930 the Texas Highway Department has been constructing numerous concrete pavements of low cement contents under a strength or quality specification; no maximum water-cement ratio or minimum cement content is specified—the contractor uses the most economical combination of cement, water, and aggregates producing a workable concrete of the stipulated flexural strength. Since 1930 approximately 700 miles of pavement containing less than 4½ sacks of cement per cu. yd. of concrete have been constructed; during the same period over 55 miles of pavement containing less than 3½ sacks of cement per cu. yd. of concrete have been constructed.

Core taken from pavements from time to time show conclusively that none of the concrete pavement has suffered loss in strength from natural weathering. (In Potter and Carson Counties of northern Texas, winter temperatures reach as low as —10 deg. F. and the air temperature drops below freezing an average of 54 times a year. It is important, however, that this cold weather generally comes at a dry season of the year.) The use of 25 to 30 percent of fines in the sand passing the 50-mesh sieve (secured by blending two or more sands) and a finer than average cement has resulted in a 1-in. slump concrete with water contents ranging from 28½ to 31 gal. per cu. yd. of concrete. The concrete is mechanically tamped in placing. The success of the projects is attributed to exceptionally good commercial aggregates and cements and to careful control of the mix design by the inspectors on the job.

In the paper, "Design and Control of Concrete Paving Mixtures — In Iowa," written by Bert Meyers and presented by R. W. Crum, the methods used to make concrete under rather difficult conditions are described. In Iowa there is not much coarse aggregate; sands are much more available though they are often lacking in fines, seldom more than 5 percent passing the 50-mesh sieve. Successful concrete has been produced using up to 70 percent sand, though present specifications limit it to 50 percent of the aggregate.

STANTON WALKER on behalf of chairman H. F. Clemmer submitted committee 617's "Proposed Specifications for Concrete Pavements and Bases" for general study and discussion. A noteworthy feature of the specification is that no distinction is made between concrete for pavements and concrete for bases.

The specification covers materials and construction. It is designed to be of particular assistance to engineers of counties, small towns and to the jurisdictions which do not now have adequate specifications. Alternate provisions are made for the design of concrete on the basis of strength or on the basis of a constant cement factor. In the proportioning of the concrete, account is taken of the requirements of conventional finishing methods as well as those involving vibration.

The use of a glacial gravel containing large percentages of quartz and chert as the coarse aggregate in the concrete of the General Mills Building, Buffalo, N. Y., was thought by J. Fruchtbaum in his paper, "Fire Damage to the General Mills Building and Its Repair," to have contributed to the severe spalling and popping of the concrete in the disastrous fire on February 15, 1940. It is common knowledge that siliceous aggregates generally have high coefficients of thermal expansion and may shatter at high temperatures; yet, it seems logical that any aggregate would contribute to the failure at the high temperatures encountered. It is likely that a good deal of moisture remaining in the 5 or 6 months old concrete

became superheated to steam and added force to the "popping". Violent "pops" extending over sections two to four feet square in area bent ⅜-in. reinforcing stirrups as much as two inches out of plumb. Temperatures in the blaze were estimated to have reached 2000 deg. F. and were maintained for several hours; high temperatures endured as much as 15 to 18 hours in certain sections of the building.

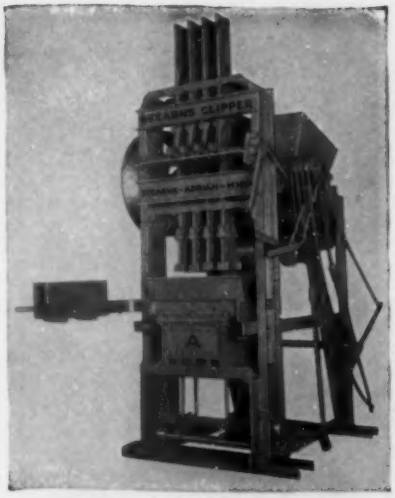
Measuring Ready Mix At Plant or in Forms?

HERBERT J. KNOPEL, in his paper, "Ready Mixed Concrete—at Plant, at Forms," presented by H. J. Witten of The Warner Co., Philadelphia, Penn., called attention to technical problems of the ready mixed concrete industry involving discrepancies in yield as measured at the plant and at the forms. The producer sells his concrete on the wet volume basis, computing the yield on the basis of the absolute volumes of all ingredients while the consumer generally determines his requirements from the dimensions given on the plans.

Deflection and inexact construction of forms and subsidence of the concrete often times result in the need for larger volumes of concrete than those indicated by the plans. A realization of the difference in yield computation is essential to harmonious producer-consumer relations. The author suggests that the subsidence of the aggregate be computed as about 3 percent of the volume of wet concrete, and in computing yield by the absolute volume method, the consumer should include no water in excess of 4½ gal. per sack of cement.

C. H. SCHOLER, of Kansas State College presented a characteristically interesting and enlightening paper under the title, "Consistent Inconsistencies in the Consistency of Concrete." He pointed to the "underbrush of misinterpretation and misinformation" that needs to be cleared away before there is a proper understanding of many phases of the concrete problem, and he said that thinking on segregation, bleeding and durability was surrounded by some of the densest and most thorny of the underbrush. "Segregation, he said, "is of course objectionable," but at the same time a necessary adjunct of placing and finishing. The problem is to design a mix requiring a minimum of segregation for suitable placement. He named poorly graded and oversized aggregates as among the principal factors leading to excessive segregation.

(Continued on page 66)



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Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Joltcrete, Stearns mixers, pallets, Straublex Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.
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STEARNS Clipper Stripper

—makes up to 4 concrete blocks per min.

A self-contained stripper block machine producing up to four blocks per minute. A production outfit offered at the lowest price ever placed on comparable equipment.

Available in several combinations, with a degree of power operation to fit any requirement. A manufacturer may start with Model E and progressively improve his equipment by adding power applications to produce any of the four combinations up to Model A, never sacrificing any of the outfit previously bought.

All Clipper Strippers use the well known Stearns eight-bar alternate drop tamping system.

Makes all standard sizes of units including rock face, header block, manhole block, brick and tile.

The Clipper Stripper has a low center of gravity, requires low head room. Rubber crank arm rollers assure quiet operation.

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Manufacturers of the famous Stearns Joltcrete Machines for manufacturing masonry units by vibration

Stearns Clipper Stripper, Model A, with Power Feeder, Tamper, Strike-off, Strip and Off-Bearer

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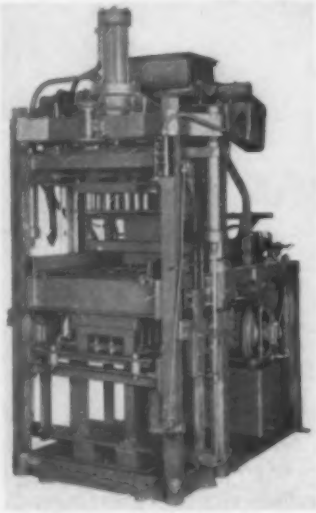
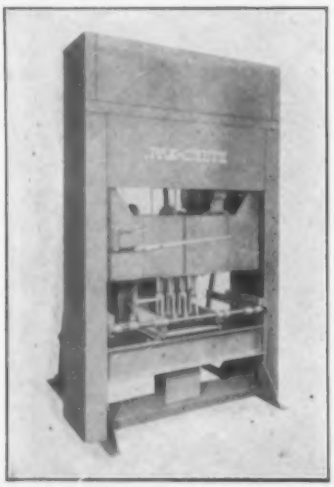


A High Production Machine
Making Blocks which are
Demanded by the Contractor
Endorsed by the Architect
Desired by the Mason

The KENT MACHINE CO.
CUYAHOGA FALLS, OHIO

A LOT OF MACHINE
FOR A LITTLE MONEY



VIBRATION AND PACKING
with
PAK-CRETE
BETTER BLOCKS AT LESS COST
PRECISION MADE—QUICK DELIVERY
KRAMER CORPORATION
LEHMANN BLDG. . . PEORIA, ILL.

Bleeding, or the separation of free water from a concrete mixture, is a form of segregation, and he called attention to the fact that the tendency to bleed is lessened by the use of more finely ground cements, finer aggregates and admixtures of various sorts. "To reduce the bleeding rate of concrete," he said, "by any means other than the reduction in the water content of the concrete is a hazardous procedure." He pointed out that concrete having high water retentive capacities and low bleeding rates may be badly abused if the engineer does not recognize that some bleeding is required, and that concrete that does not bleed may be defective if water is added to make it bleed to accord with criteria developed by the use of coarsely ground cement and coarsely graded aggregates.

At the annual banquet, William Harrison, Director of the Construction Division of the Office of Production Management, spoke on "Defense Construction." The Wason Medal for "the most meritorious paper," was presented to R. E. Copeland and C. C. Carlson of the Portland Cement Association, authors of "Tests of the Resistance to Rain Penetration of Walls Built of Masonry and Concrete." George W. Washa, Instructor in Mechanics at the University of Wisconsin was presented the Wason Medal "for noteworthy research," as represented by "Comparison of the Physical and Mechanical Properties of Hand-Rodded and Vibrated Concrete made with Different Cements." A certificate of honorary membership was awarded to B. F. Affleck, charter member of the Institute and formerly president of the Universal-Atlas Cement Co.

Quiz Session

The concluding session of the convention was a "Quiz Session" in which a "Board of Experts" answered written questions about concrete; the program was very similar to "Information Please," except that the "experts" knew the questions in advance. A. J. Boase was master of ceremonies while the Board of Experts consisted of: R. L. Bertin, R. W. Carlson, A. B. Cohen, R. W. Crum, H. J. Gilkey, A. T. Goldbeck, Fred Hubbard, F. H. Jackson, W. G. Kaiser, C. A. MacLaren, F. R. McMillan, Ben Moreell, C. L. Post, F. E. Richart, C. H. Scholer, R. B. Young, and Stanton Walker.

New Ready Mix Trucks

CAMDEN LIME CO., Camden, N. J., has purchased $20,000 worth of equipment, principally concrete trucking equipment and a new hopper.

Ready Mixed Concrete Short Course

OHIO READY MIXED CONCRETE ASSOCIATION has announced through Claude L. Clark, secretary, that a ready mixed concrete conference was held on March 25 and 26 at Ohio State University under the direction of Prof. George E. Large of the Department of Civil Engineering.

On the first day there was a demonstration of the trial method of designing concrete mixtures and a discussion of "Short Cuts for Figuring Quantities" by R. S. Phillips, concrete technician, Portland Cement Association; a paper on "Operating Problems of the Ready Mixed Concrete Industry" by Stanton Walker, National Ready Mixed Concrete Association; a talk by R. R. Litehiser, "Ready Mixed Concrete Operations Under Ohio Department of Highways Specifications," "The Shaw-Baver Moisture Determinator," by A. R. Olpin; and "Characteristics of Hardened Concrete" by Ray B. Crepps, Purdue University.

On the second day R. S. Phillips had for his subjects, "The Role of the Aggregate in Producing Durable Concrete" and "Some Suggestions Concerning the Delivery and Placing of Ready Mixed Concrete"; and Kyle W. Armstrong, consulting engineer, Columbus, Ohio, talked about "Ready Mixed Concrete for Buildings." The highlight of the day, however, was the open forum discussion on operating and merchandising problems at which Stephen Stepanian presided. C. E. Ehle, president of the Association, presided at the banquet, and R. O. Davies, vice-president, was chairman of the second day's session.

Concrete Silo Plant

MARIETTA CONCRETE CORPORATION, Marietta, Ohio, has acquired the plant of the Concrete Pipe Co., Lilesville, N. C., and will invest $50,000 for the manufacture of concrete silos. C. H. Hause, formerly general sales-manager of the company, will be manager of the southern division and in charge of the Lilesville plant.

To Make Large Pipe

LOCK JOINT PIPE CO. has just built a concrete pipe plant at Navarre, Ohio, just south of the Massillon Wash Gravel Co. T. J. Chiverton is plant manager. Proximity to a source of raw material at the nearby gravel company and market possibilities within a radius of 100 miles of the village were listed as reasons for the location of the plant.

QUINN PIPE FORMS

HAND or WET PROCESS

Make concrete pipe on the job with Quinn Pipe Forms. They can be handled by less experienced labor and produce uniform concrete pipe of highest quality. Quinn Pipe Forms make pipe conforming to A. S. T. M. requirements as to wall thickness and other standards.

Quinn Heavy Duty Pipe Forms are built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell end pipe—any length. Backed by over 30 years of service in the hands of contractors, municipal departments and pipe manufacturers.

HEAVY DUTY PIPE FORMS

Our Heavy Duty type with Adjustable Locks is shown above. Quinn Heavy Duty Forms are also available with a new wedge-type lock.

MEDIUM DUTY PIPE FORMS

Meet the demand for low cost equipment that produces a uniform quality of pipe in smaller amounts. For making pipe 12 to 60 inches in diameter—any length.

WRITE TODAY

Get complete information on prices and Special Construction Features of Quinn Pipe Forms. Give us size of job for estimate on your pipe form needs.

Also manufacturers of Quinn Concrete Pipe Machines for making pipe by machine process.

QUINN WIRE & IRON WORKS 1603 17th ST. BOONE, IA.

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CONCRETE BRICK CAN BE MADE WITHOUT PALLETS ON THE

JACKSON CONCRETE BRICK MACHINE

Just Think What This Means in Dollars and cents saved in handling and upkeep as well as the cost of the pallets themselves.

Investigate today the most efficient and up to date concrete brick making equipment on the market.

JACKSON & CHURCH CO.
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LIGHT IN WEIGHT

SAVE TIME—LABOR

Crescent Pipe Forms are known and used world wide. They are lighter in weight, therefore easier to handle, save time and labor. They are reinforced to give a rigid mold that retains its perfect shape. Core and casings easily and quickly removed. Made in all styles, lengths and sizes.

Ask for prices and literature.

FLINT & WALLING MFG. CO., INC.
KENDALLVILLE, INDIANA

96,000 new homes have the comfort and protection of firesafe

CONCRETE FLOORS

Are you getting your share of this business?

96,000 homes are enough to house the entire city of Indianapolis. That much construction in five years shows that there's a really *big* market for concrete floors . . . a ready opportunity for builders and realtors.

You know that concrete floors have many sales features. But home buyers need to be *told or shown* that concrete floors—

- **Act as barriers against the spread of basement fires.**
- **Stiffen and strengthen the whole house.**
- **May be colored and waxed, or given any covering. Every buyer suited!**
- **Promote warmth and comfort; do not creak or sag.**
- **And cost little or no more than ordinary construction, because of improved methods.**

It pays to work with builders to advertise and demonstrate these concrete values.

PORTLAND CEMENT ASSOCIATION
Dept. A4-45, 33 W. Grand Ave., Chicago, Ill.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

NEWS ABOUT PEOPLE

BURR H. SIMPSON has been elected president of the West Virginia Sand and Gravel Co., Charleston, W. Va., and its affiliated company, the Standard Brick and Supply Co. Mr. Simpson, who resigned as West Virginia road commissioner, succeeds Arthur M. Hill, who recently resigned.

•

C. W. HINER has been appointed acting district engineer in Nebraska for the Portland Cement Association. Mr. Hiner's appointment follows the resignation of H. J. Young and climaxes 13 years of service as a field engineer with the Association in Lincoln.

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H. C. MAGINN, sales manager of Calaveras Cement Co., San Francisco, Calif., has been elected vice-president and will be in charge of the company's sales and traffic departments. He has been with Calaveras since its organization.

•

W. LEE HEIDENREICH, formerly chief engineer of the New York Trap Rock Corp., is now at Potosi, Bolivia, where he is mine superintendent for Cia. Min. Unificada del Cerro de Potosi.

•

IRA DYE is now superintendent of the Plaster City, Calif., plant of the Pacific Portland Cement Co., succeeding I. S. Elliott.

•

FRED WITMER, SR., president and E. H. Mauntler, secretary, of the Ohio Hydrate & Supply Co., Woodville, Ohio, are officials of the newly-formed Refractories, Inc.

•

H. HERBERT HUGHES, formerly chief economist of the Mineral Production and Economics Division of the U. S. Bureau of Mines, has joined the staff of the Automobile Manufacturers Association. He will assist members of this organization in supply problems of the industry involving priorities or problems otherwise relating to the defense program.

•

COLBY STILSON, a partner in the law firm of Breed, Abbott & Morgan, New York City, has been elected a director of the Wolverine Portland Cement Co., Coldwater, Mich.

E. V. APT, traffic manager and assistant sales manager of the Southwestern Portland Cement Co. at Osborn, Ohio, has been promoted to sales manager. Mr. Apt has been associated with the company since the opening of the Osborn plant in 1925.

J. S. DUNCAN and G. H. AIKINS have been elected directors of the Canada Cement Co., Ltd., to succeed G. W. Allen and T. A. Russell, deceased.

•

M. L. SILCOX was reported in the March issue to have been transferred to the Nazareth, Penn., plant of Pennsylvania-Dixie Cement Corp., as superintendent. This was an erroneous report, as Mr. Silcox is still chief chemist of Pennsylvania-Dixie's Des Moines, Iowa, plant. Our apologies, please.

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T. B. COUNSELMAN, manager of the Chicago Industrial Division of the Dorr Co., has been elected chairman of the Chicago section of the A.I.M.M.E. for 1941.

The McGrady Family

W. L. SMITH, president of the Memphis Stone and Gravel Co., loaned ROCK PRODUCTS the accompanying picture showing the operation some 30 years ago, accompanied by a letter of B. McGrady, formerly active in the company. Mr. McGrady says: "This picture was taken on the old Judge Davis property at Camden, Tenn., on the side opposite the present operation. The shovel is a Victor, owned by me. Standing on the ground on the end of the jack arm is Barney McGrady, standing on the shovel is Bud McGrady, standing in front of the Vulcan dinky locomotive, is a neighbor boy, Goldie Rushing, sitting in front of the dinky, Bernard McGrady, standing is Henry McGrady, and on the extreme right, sitting, is Chris McGrady and standing on the running board of the dinky is John McGrady." So here, readers, you have an early portrait of one of the first sand and gravel families of Tennessee.

Obituaries

G. L. DAVIDSON, general manager of the Ruhm Phosphate and Chemical Co., Mt. Pleasant, Tenn., died February 22. He was the designer of the Ruhm company's hydraulic mining and washing plant at Mt. Pleasant. Mr. Davidson was a chemical engineer, had been with one of the steel companies in Chicago before coming to Mt. Pleasant, and was one of the patentees of the first sintering machine. He had been with the Hoover & Mason Phosphate Co. when they entered the Tennessee field.

•

ROBERT H. RADCLIFF, president of the Radcliff Gravel Co., Inc., Mobile, Ala., died February 26 at the age of 57. During his entire business career Mr. Radcliff was connected with the sand and gravel business.

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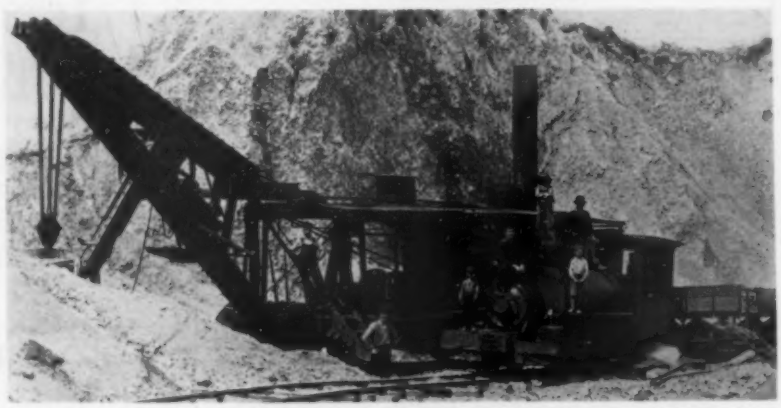
JOHN M. MEFFERT, one of the pioneers of the lime industry, died recently. He founded the Florida Lime Products Co., Inc., Ocala, Fla., and was president until he retired in 1926. It has since been operated by his son,



Here's how the McGrady family looked thirty years ago and what they used to excavate aggregates at Camden, Tenn.

W. H. Meffert. In 1892 John M. Meffert began the manufacture of lime and in 1898 he purchased the Ocala Lime Works, the name of which he changed to the Florida Lime Co.

•

ERNEST P. WILLIAMS, former district sales manager of the Alpha Portland Cement Co., at Easton, Penn., died March 6 at the age of 67. He joined the sales department of the Alpha company in 1901 and retired in 1938, at which time he was district sales manager in charge of two districts.

•

WILLIAM R. OGLESBY, vice-president and chief chemist for the Carney Co., Mankato, Minn., died March 14. He was 65 years of age. He joined the Carney Co. in 1929 after holding the position of superintendent of the Hidalgo Portland Cement Co. at Monterey, Mexico.

A graduate of the University of Pennsylvania in 1898, he became interested in cement chemistry while employed by the Spackman Engineering laboratories. Later he assisted in erecting cement plants in the United States, Mexico, Cuba and Canada.

In the Carney laboratories Mr. Oglesby developed the present improved Carney masonry cement and Carney natural cement, and out of his research came the Carney rock wool.

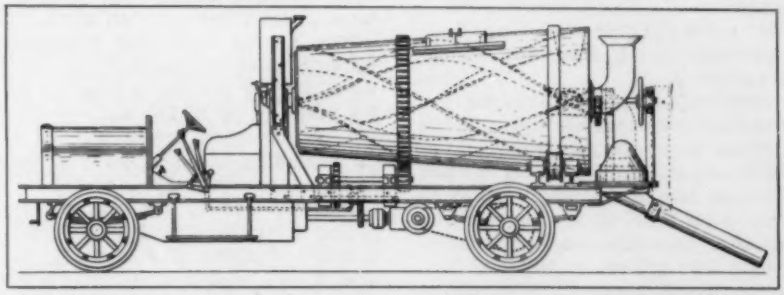
(Other Obituaries appear on page 91)

Inventor of Truck Mixer

ASKED to give a historical sketch of the development of machinery for the sand and gravel and ready-mixed concrete industries at the recent Cincinnati conventions, the editor of ROCK PRODUCTS overlooked at least one very important contribution. It is the fact that Stephen Stepanian, Arrow Sand and Gravel Co., Columbus, Ohio, is the actual inventor of the concrete truck mixer, and that his invention antedated by almost ten years the general use of truck mixers.

Just 25 years ago, in April, 1916, Steve applied for a patent (quoting from the application) for "an invention relating to concrete mixers, and is directed principally to the combination of mixer drum and motor vehicle, arranged to be set in operation to cause thorough mixing of the ingredients forming the concrete either while the vehicle is stationary, or as it moves to its point of destination. This invention realizes the fact that it is necessary to transport the materials from which the concrete is made to their point of use, this transportation having heretofore been done separately, and (the ingredients) then mixed on the ground. This requires an additional amount of labor, whereas my invention utilizes the same vehicle for transporting the ingredients, but instead of transporting each in bulk, they are suitably proportioned while the vehicle is being loaded, and then may be mixed during their period of transportation. In this manner, the concrete itself may be delivered to the point of use instead of delivering the separate ingredients.

"My invention also resides in the combination of means for discharging the concrete from the mixer drum, whenever this discharge is desired." The device included a separate water tank, with a gage, so that the water could be added to the mix at any time desired.



Mr. Stepanian's original truck mixer design. Although the patent application was filed in 1916 it can be readily seen that the operation and construction is on the same principles as the modern truck mixer

Steve says his ideas were crystallized in 1914 or 1915. The date his patent application was filed was April 8, 1916. By April 21 following, the examiner of the patent office had rejected the application on these grounds: "There is no patentable combination between a 'motor vehicle' and the other elements of each of the claims at bar as neither affects or modifies the function of the other.... It is also not new to mount a mixer with its operating engine on a vehicle, said vehicle also being driven by said engine." The examiner then quotes two previous patents, one in 1895 and one in 1905, as proof of his contention.

Of course, there were no motor trucks in existence in 1895 and probably none in 1905. The patents cited were for steam-engine-driven concrete mixers which could be moved about on the job under their own power—obviously not in the least anywhere near the conception of a concrete mixer which could mix and transport concrete from plant to job in a single operation.

There followed a long-drawn-out correspondence and numerous revisions of the patent specification in an attempt to establish the novelty of this device. However, the patent office examiner stuck to his contentions and on November 4, 1919, the application for a patent was finally rejected—on exactly these same contentions.

Whether the patent office examiner just couldn't conceive what Steve was driving at, or whether he just wouldn't, remains a mystery. Anyhow, about six months later a patent was granted to a Kansas City, Mo., contractor named Bickle for almost identically the same device. He may have had better luck in having his application passed on by a patent office examiner with more vision, he may have had a better lawyer, and probably he did not suffer from Steve's handicap at that time of not being an American citizen.

If the reader will study the design he will see that it embodies nearly all the features of a modern truck mixer, even including a clever spout device for discharging the mixer, which folds up as in recent designs. The mixing drum is mounted on a pivotal bearing located at one end of the drum behind the driver's seat, and the other end of the drum on two rollers, making a three-point suspension type of structure, which is the present-day practice for drum supports so that it can adjust itself to unevenness of the chassis.

The Koehring Machine Co., Milwaukee, Wis., built a truck according to Steve's design, while the patent was pending. It was too heavy, but redesign could undoubtedly have corrected that fault. So, Steve Stepanian missed being the original concrete truck mixer manufacturer, and it is time he received the recognition he so richly deserves, even if minus the royalties and profits that might otherwise have been his.

NEW MACHINERY * NEW EQUIPMENT

Truck Designed with Power Proportioning

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wis., has brought out a line of trucks which feature lighter weight and greater accessibility. The newly designed models of the lighter

Trucks may be equipped with power take off that will utilize all speeds of the transmission

"H" series are now available and refinements in 15 other models are being made.

Provision has been made for the use of optional engines which in the "H" series allows for engines from 85 hp. to 113 hp. Two series of axles are also available in these trucks to take gross loads up to 20,000 lb. The transfer case is arranged so that a power take off can be installed that will utilize all the speeds of the transmission and the full torque of the motor for earth boring machines and similar services.

The fender arrangement is said to accommodate all types of snow plows and front end equipment without alterations to the skirting and fenders. Another feature is the power proportioning differential for four- and six-wheel drive trucks which divides the power in the center of the truck to each axle in proportion to its normal loaded weight.

Bearing Greases

GULF OIL CORPORATION, Pittsburgh, Penn., has developed two new lines of lubricating greases for ball and roller bearings.

One, designated Gulf Anti-Friction Grease, is recommended for heavy duty service. The other, Gulf Precision Grease, is recommended for lighter duty and higher speeds. Both have a high melting point and are specially prepared for greatest resistance to oxidation and separation.

Both of these new lubricants are available in a wide range of consistencies for any method of application or operation condition—consistencies recently recommended by the National Lubricating Grease Institute which went into effect March 1, 1941.

Tractor with Hydraulic Steering Control

CATERPILLAR TRACTOR CO., Peoria, Ill., has announced a 55-hp. Diesel tractor, the D6, which has been designed to relieve the driver from as much fatiguing labor as possible. As an example, it is claimed that although the tractor weighs more than eight tons, it can be steered as easily as an automobile. A separate control unit does the work by hydraulic pressure when only 14 lb. of pull are exerted on the steering clutch levers.

The tractor has nine practical working speeds; five of these are forward, offering a range of from 1.4 to 5.8 miles an hour. For each of the first four forward speeds there is a corresponding, but slightly higher reverse.

It is powered by a 6 cyl., water-cooled Caterpillar Diesel engine, with a bore and stroke of 4¼- x 5½-in., and a full loaded governed r.p.m. of 1400.

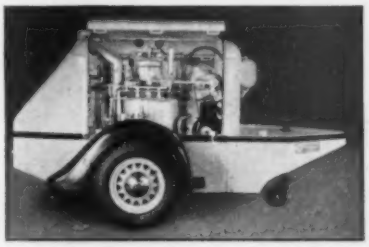
A spark-ignition tractor, the R6, of the same horsepower, also has been announced. This machine has a 6 cyl., gasoline engine of the same bore and stroke and is of similar engineering design.

Automatic Heater for Batching Plants

LITTLEFORD BROS., Cincinnati, Ohio, has on the market the "Tankar" heater, a compact, oil-burning steam generator, that is applicable to the heating of aggregates while simultaneously heating mixing water in ready-mixed concrete batching plants.

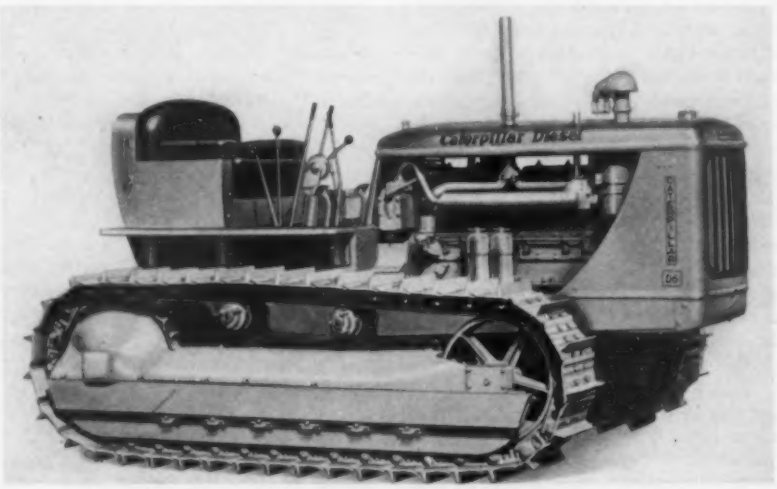
It consists essentially of a high-speed boiler, oil-fired 1½-hp. gasoline engine for driving a water pump, a fuel pump, blower for combustion air for the burner, water tank and automatic features — compactly designed so that the unit can easily be installed on the batching floor of the average concrete plant.

It is claimed that the heater is capable of producing 200 p.s.i. steam in



Oil-burning steam generator for heating aggregates and mixing water

two minutes and that any desired steam pressure can be maintained without attention because of the automatic features. The heater operates by starting the gasoline engine, which drives the water pumps, fuel pump, the blower for combustion air for the burner and a magneto for the electric ignition. A No. 3 or better fuel oil is used with a consumption of 1 lb. of fuel for 10 or 12 lb. of steam generation, an 80 percent efficiency, according to the manufacturer, and with a range of 75 p.s.i. to 250 p.s.i.



Diesel-powered tractor in which the engine is completely sealed against dust or dirt

Dispersion Drying

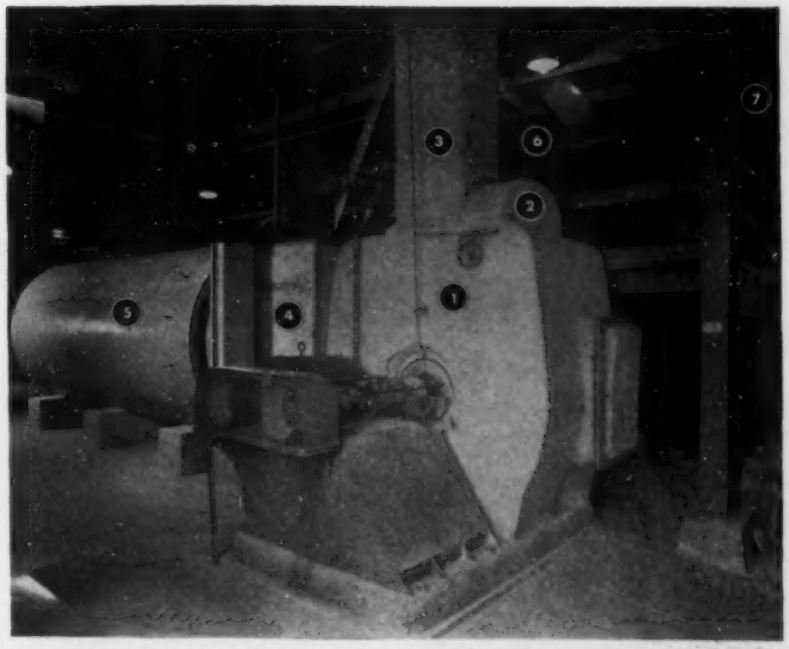
WESTERN PRECIPITATION CORPORATION, Los Angeles, Calif., has developed what has been termed a Turbulaire dispersion dryer which has a number of applications in the rock products industries. It is claimed that the turbulent dispersion in high temperature gases made possible in this equipment gives the activated aeration necessary to speed the drying cycle. Capacities of the various units manufactured range from 75 lb. to as high as 4000 lb. water evaporation per hour.

This system of drying is being used for drying pumicite and to handle metallurgical slime that is colloidal and unfilterable.

In dispersion drying, the wet material is fed continuously to a pug mill mixer. It is mixed with damp material returned from the Impax separator which is part of the collecting system, and in some cases with a portion of the finished product collected in the Multiclone.

The wet semi-solid material is internally circulated by mechanical means with the heated drying medium in the Turbulaire dryer where the drying takes place in agitated suspension. Partly dried oversize particles thrown down in the Impax separator are returned to the pug mill to be mixed with fresh raw material and recirculated in the cycle. The fine, dry finished product passes through the Impax separator and is collected in the Multiclone.

The drying medium may be the products of combustion with either a gas-, oil- or coal-fired furnace, diluted with fresh air or air recirculated from the dryer vent to the desired inlet temperature of from 200 to 1200 deg. F.



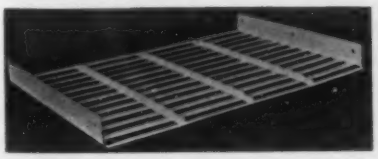
Dryer which operates by turbulent dispersion in high temperature gases. Number 1 is the dryer; 2, recirculating duct; 3, outlet duct to air separator and dust collector; 4, mixing chamber for incoming gases; 5, direct fired air heater; 6, pug mill mixer discharging to dryer; and 7, the finished product conveyor to storage or bagging

Eliminate Flat Particles

HENDRICK MANUFACTURING CO., Carbondale, Penn., has brought out a shutter picker with flanges to use on a shaking screen for the removal of flat particles from stone, gravel and other granular materials. This equipment has been used in the coal fields for eliminating flat particles from various sizes of coal, and recently has been adapted for a similar use in processing stone and gravel.

The shutter picker is made with a series of blades which are pitched slightly upward and with an opening between the blades. This opening between the blades is set to remove any definite size of flat particle from the material being screened. Size of any opening can be set at any depth from ⅞-in. to 1¼-in. The width of the blades is made of a size to correspond with the slot opening, the smallest width being 3-in. and the largest 6-in.

Shutter pickers are said to work satisfactorily in shaking screens; vibrating and shaking screens which operate in a level position; and pitched vibrating screens by running the screen against the flow of the material.



Screen attachment for the removal of flat particles

Crawler-Mounted Blast Hole Drill

THE KEYSTONE DRILLER CO., of Beaver Falls, Penn., has brought out a crawler-mounted, Model 51, blast hole drill which employs a combination of welding and riveting in the structural framing.

Perpetual shock, which must be dealt with in the design of a blast hole borer, is met in this unit by the use of very large, short span shafting and anti-friction bearings of ball or roller types; by transmitting power to the drilling crank through a heavy, shock neutralizing, multi-cord belt and by a system of masthead shock absorption. Other features are a dual spring cushion under the crown-pulley, of such capacity as to preclude breakage or deterioration in service, and an hydraulic recoil cylinder.

The machine incorporates the Keystone system of spudding motion and stroke adjustment, a power derrick-raising device and pantograph tool-guide. It is mounted on full crawlers which are independently driven and reversed for convenient steering. It has sufficient stability to be moved over ordinary terrain with derrick erected. The full height of the derrick is 38 ft.; and it may be telescoped for operation at a height of 24 ft. 4½ in.

The weight, 18,200 lb., is distributed to give a ground pressure of 7 lb. to the square inch.

Blast hole drill which may be telescoped

Big Contract for Dam

AMERICAN AGGREGATE CORP., Greenville, Ohio, has obtained the contract to supply nearly one million tons of concrete aggregates for the Fort Loudoun dam near Lenoir City, Tenn. Most of the material will be dredged from the large bar at the mouth of the Little Tennessee River. Two tow boats, seven barges and a 16-in. suction dredge will be used in recovering and transporting the material.

From Quarrying to Mining

CENTRAL ROCK CO., INC., Lexington, Ky., is changing from open quarrying to a mining operation. A vertical concrete-lined shaft has been driven alongside the primary crusher to a depth of 250 ft. The mine will be developed in the conventional room-and-pillar pattern with balanced skip buckets delivering stone into the primary crusher. Rock in the mine is higher in magnesia and is harder than that quarried in the present workings.

Heavy Movement of Rock Phosphate

FROM TENNESSEE phosphate fields there has been a 60 percent increase in movement of ground phosphate rock for direct application to land during January, February, and March, according to local reports. Widely varying freight rates have cut down shipments to a certain extent due to the uncertainty of price quotations. The expected influx of Florida rock into territory tributary to Tennessee has not developed. Exportation from Florida to West Indies, South Africa, Australia and New Zealand as well as South America has removed Tennessee territory from competition with the Florida field.

Record Industrial Expansion

IF THE PRESENT RATE of plant and equipment expansion continues through 1941, this country's industrial defense effort will involve 3½ billion dollars annually, 1 billion dollars more than at the peak of the world war.

This is the conclusion reached from figures to be published in the March issue of the Department of Commerce's survey of current business.

For the first three months of this year, plant and equipment expansion, both public and private, will exceed that of "any previous quarter in the nation's history," the department's report found. Last year 2.3 billion dollars was spent on expansion while in 1929 the figure was 2.7 billion dollars.

The only other period during which plant and equipment expansion neared the expected rate for 1941 was in 1920, when 3.2 billion dollars was spent. However, the survey points out, this was a time of "very high prices."

Flotation for Magnesite

NORTHWEST MAGNESITE CO., Chewelah, Wash., has under way a big improvement program. The latest expansion involves the construction of a 300-ton flotation mill to concentrate magnesium ores. Dean A. W. Fahrenwald of the University of Idaho School of Mines has been consultant and supervising engineer for the mill construction. Improvements which have been completed include: a processing plant for producing magnesite dust; additional drying sheds which permit increasing output of Thermax, a building board used in constructing army and navy airplane hangars; and the rebuilding of the electric substation.

Quarry Improvements for Cement Plant

GLENS FALLS PORTLAND CEMENT CO., Glens Falls, N. Y., has announced through President Titsworth that the company spent $119,405 in 1940 on additions to plant, of which $103,440 represents expenditures for modernization of quarry equipment. Further sums to complete the quarry improvements are being expended and the new layout will be in operation about the middle of April.

Start Up Santee-Cooper Gravel Plant

BECKER COUNTY SAND AND GRAVEL CO., Detroit Lakes, Minn., is now shipping 40 carloads of sand and gravel daily from its new plant at Cheraw, S. C., which will supply concrete aggregates for the Santee-Cooper project.

Reorganize Hydraulic Cement Concern

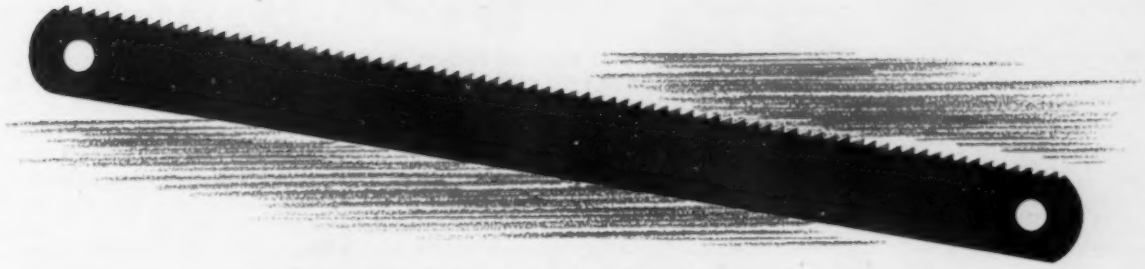
THE UTICA HYDRAULIC CEMENT CO., Utica, Ill., has qualified under section 77-B, Federal Bankruptcy Act, to reorganize its properties. Fred Gerding, Ottawa, Ill., has been appointed trustee by the federal court.

Ohio Considering Superhighways

HEARINGS are being held in the Ohio legislature on a bill by Rep. Carl Guess, proposing that the state highway director be authorized to engage in the construction of high-speed, super-highways similar to the Pennsylvania Turnpike.

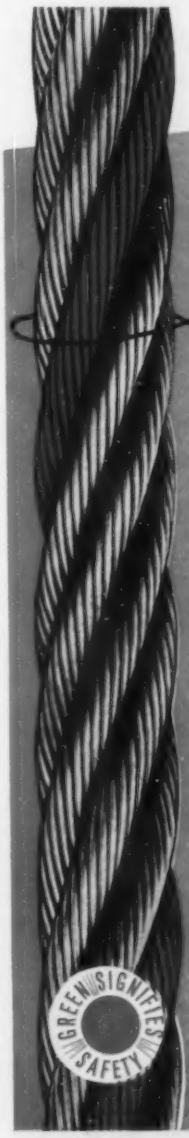
Motor truck train operated by Cooper Supply Co., Detroit, Mich., hauls 27 cu. yd. of sand and gravel from the storage yard to the ready mixed concrete plant. It comprises a White tractor truck hauling a Fruehauf semi-trailer of 12 cu. yd. capacity and a trailer of 15 cu. yd. capacity

In these days—would you buy a hack saw which lasted twice as long?



"Obviously—yes"—you say. "So what?"

Only this—that we are trying to point out you can find the same difference in wire rope that you do in a hack saw.



for Greater SPEED, ECONOMY and SAFETY

HAZARD LAY-SET *Preformed*

● In comparison with non-preformed wire rope Hazard LAY-SET Preformed invariably gives *much* longer and better service. That means fewer machine shutdowns —better production—more efficient operation. In short: Speed —Economy—Safety.

Hazard LAY-SET Wire Ropes will do this because they are preformed. "Preforming" is a mill process which places every wire and strand in a relaxed condition. This elimination of internal stresses within the steel gives LAY-SET extreme resistance to fatigue—and that means longer life. In addition, the preforming process makes LAY-SET resist kinking, handle easier and faster. It eliminates all necessity for seizing the ends, makes it safer for workmen to handle.

For longer rope life, fewer machine shutdowns, increased production, reduced injuries to workmen—specify Hazard LAY-SET Preformed Green Strand. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

HAZARD WIRE ROPE DIVISION • WILKES-BARRE, PENNSYLVANIA

Established 1846

AMERICAN CHAIN & CABLE COMPANY, INC.

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

FINANCIAL NOTES

RECENT DIVIDENDS ANNOUNCED

Arundel Corp.	$ .50	April	1
Calaveras Cement Co., pfd.	1.00	March	10
Canadian Crushed Stone Co.	.10	March	31
Glens Falls Portland Cem. Co.	1.50	April	1
Lone Star Cement Co.	.75	March	31
Longhorn Portland Cem. Co.	.25	March	15
Superior Portland Cem. Co.	.82½	April	1
U. S. Gypsum Co.	.50	April	1
U. S. Gypsum Co., pfd.	1.75	April	1
Yosemite Portland Cem. Co.	.05	April	1

•

NEW YORK TRAP ROCK CORP., New York, N. Y., showed a net profit of $104,267, after charges, for the year ended December 31, 1940. This compared with a net profit of $81,129 in 1939.

•

AMERICAN LIME & STONE CO., Bellefonte, Penn., had a net loss of $9,633 as compared with a net loss of $1,317 in 1939.

•

GYPSUM, LIME & ALABASTINE, CANADA, LTD., Paris, Ont., had a net profit of $208,042 for the year ended November 30, 1940, as against $165,069 for the similar period in 1939.

•

SOUTHERN PHOSPHATE CORP., Baltimore, Md., had a net income of $151,775 for the year ended December 31, 1940, as against $98,221 for 1939.

•

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., presented the following consolidated income account for the years ended:

	1940	1939
Net sales	$16,923,588	$14,804,465
Cost of sales	9,688,255	8,360,132
Depreciation and depletion	1,854,630	1,621,768
Sell., etc., exp.	2,884,374	2,525,126
Operating profit	2,496,329	2,297,439
Margin of profit	14.75%	15.52%
Other income	215,051	403,821
Total income	2,711,380	2,701,260
Fed. income tax	680,523	444,039
Net income	2,030,857	2,257,221
Preferred divs.	227,004	227,004
Common divs.	1,123,255	1,129,131
Surplus for year	680,598	901,086
Surplus, Jan. 1	9,926,337	9,025,251
Surplus, Dec. 31	10,606,935	9,926,337
Times pfd. divs.	8.95	9.94
Earn. pfd. share	$35.79	$39.77
No. of pfd. shares	56,751	56,751

President Joseph S. Young, in a report to the stockholders, said that the company is faced with constantly mounting costs without corresponding increases in price. Average wage rates have gone up 45 percent per barrel since 1926 while the average price during the same period decreased 12½ percent. Taxes, coal and other material prices also have gone up. Capital additions and improvements made during 1940 totaled $3,116,000, including additional cement storage silos at Fogelsville, Fordwick, Oglesby and Iola at a cost of $640,000, and another $900,000 was spent to complete construction at Alsen.

•

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., received an adverse decision from the U. S. Supreme Court on its reorganization plan. The court upheld a contention by the SEC that a plan for reorganization, under the Federal Bankruptcy Act, of two or more companies in a new corporation may provide for meeting bondholders' claims against each company through payment in securities of the new corporation.

•

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, had a net profit of $661,525 for the year ended December, 31, 1940, as compared with a net profit of $412,583 for the year ended December 31, 1939. Net sales in 1940 were $6,938,604 as against $6,114,497 in 1939.

•

PETOSKEY PORTLAND CEMENT CO., Petoskey, Mich., has issued the following consolidated income account for the years ended December 31:

	1940	1939
Net sales	$1,963,745	$1,729,684
Cost of sales	1,239,704	1,109,784
Selling expense	392,962	356,123
*Operating profit	331,079	263,777
Margin of profit	16.86%	15.25%
Other income	16,056	10,166
Total income	347,135	273,943
Interest	18,703	29,414
Other deducts.	1,806	8,574
Prov. for taxes	67,696	40,154
Net profit	258,929	195,801
Dividends	60,000	.....
Surplus for year	198,929	195,801

* After depreciation and depletion.

President John L. A. Galster, reviewing the past year and future activities, said that additions to plant totaled $63,000 in 1940, and the company plans to install a new turbine and surface condensor in the power plant which will cost approximately $138,000.

CORONET PHOSPHATE CO., New York, N. Y., with two plants in Florida, had a net income of $11,784 for the year ended December 31, 1940. This compares with a net income of $55,089 for a similar period in 1939.

•

LAWRENCE PORTLAND CEMENT CO., New York, N. Y., showed a net profit of $37,837 in the year ended December 31, 1940, as compared with $117,894 for a like period in 1939. Net sales in 1940 were $2,417,678. President Ayres stated that a material decrease in the amount of business offered during the year in the territory served by the company's Maine plant, and higher manufacturing costs at the Pennsylvania plant were chiefly responsible for the comparatively unfavorable showing last year. Higher costs at the Pennsylvania plant, he said, were due to increased demand for special types of cement. He reported that indications pointed to an improved demand for cement in 1941.

•

SUPERIOR PORTLAND CEMENT, INC., Seattle, Wash., had a net income of $490,602 for the year ended December 31, 1941, which compares with 1939 earnings of 845,570. This reduction in earnings is a reflection of the drop in production due to cessation of shipments for Grand Coulee Dam construction.

•

LONE STAR CEMENT CORP., New York, N. Y., has purchased 21,657 shares of its stock from British holders for $831,087. It is planned to recommend to stockholders at the annual meeting that these shares, plus 7541 held in the treasury, be retired.

Basic Dolomite, Inc. Changes Name

BASIC DOLOMITE, INC., has reported a net profit of $445,890 for the year ended December 31, 1940. This compares with $320,300 for a similar period in 1939. President H. P. Eells, Jr., at the annual meeting stated that current shipments are at record level and that the development of business in the company's new line of magnesite products was gratifying. On March 25 the stockholders voted that the name of the company be changed to Basic Refractories, Inc. In 1936 the company acquired by lease and since has added by way of fee ownership, large deposits of brucite and magnesite situated in Nevada. The addition of these raw materials has enabled the company to cover the entire field of basic refractories.

LIMA

IS "RIGHT AT HOME" IN HARD DIGGING

Stripped of all unnecessary weight by the use of modern steels, plus the latest mechanical features in excavator design, LIMA shovels, draglines, and cranes are constantly establishing new records for big production and low cost operation. LIMA excavators are modern throughout and are qualified to meet the toughest kind of assignments. Sizes range from ¾ yard to 3½ yards capacity. For your next shovel, dragline, or crane, it will pay you to investigate LIMA.

LIMA LOCOMOTIVE WORKS, INCORPORATED

Shovel and Crane Division **LIMA, OHIO**

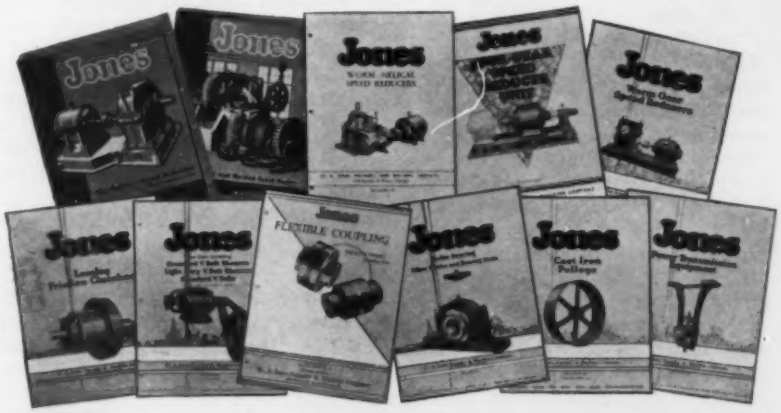
NEWARK, N. J. NEW YORK, N. Y. MEMPHIS, TENN.
LOS ANGELES, CALIF. SAN FRANCISCO, CALIF. PORTLAND, ORE.
DALLAS, TEXAS SEATTLE, WASH. SPOKANE, WASH.
CHICAGO, ILL. MINNEAPOLIS, MINN.

"I didn't know you people made_____!"

(fill in to suit)

WE have been in business now for 50 years and yet quite often some good customer of ours says—"Why, I didn't know you people made friction clutches!" Or the exclamation might cover skip hoist drives, car pullers, door hoists or any one of many other Jones products.

In dealing with our suppliers we often find ourselves in the same position. We establish certain buying habits and it sometimes comes as a shock to find that a firm right around the corner may have just the services or the products we need.

We therefore present the group of catalogs shown below with the thought that some one of them may help you solve some problem that has just come up.

ANY, OR ALL OF THESE JONES CATALOGS SENT ON REQUEST

No. 70—Jones Herringbone Speed Reducers
No. 71—Jones Cut and Molded Tooth Gears
No. 75—Jones Worm Helical Speed Reducers
No. 55—Jones Spur Gear Speed Reducer Units
No. 68—Jones Worm Gear Speed Reducers
No. 60—Jones Lemley Friction Clutches.
No. 58B and 76—Jones V-Belt Sheaves
No. 78—Jones Flexible Couplings
No. 56—Jones Roller Bearing Pillow Blocks
No. 69A—Jones Cast Iron Pulleys
No. 61—Jones Power Transmission Equipment

Jones HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES
ANTI-FRICTION PILLOW BLOCKS • PULLEYS
FRICTION CLUTCHES • TRANSMISSION APPLIANCES

W. A. JONES FOUNDRY & MACHINE COMPANY
4447 Roosevelt Rd., Chicago, Ill.

Reach Settlement on Chert Gravel in Toledo

NEW SPECIFICATIONS have been approved by the City of Toledo which will permit gravel containing small percentages of deleterious chert to compete with other coarse aggregates in purchases for city concrete construction work. The city had heretofore placed severe restrictions on gravel.

The new specifications were drawn up by Stanton Walker, engineering director of the National Sand and Gravel Association, and Dr. H. F. Kriege of the France Stone Co., and were adopted from specifications drawn by a committee of the A.C.I., the A.S.T.M. and the Highway Research Board. They recommended that unsound chert be limited to one percent and also recommended a standard test of coarse aggregate materials.

JAMES A. NICHOLSON, president, Builders and Industrial Supplies, Inc., had charged that the specifications as they were written had prevented gravel dealers from successfully entering bids with the city, but has approved the new recommended specifications, which are similar to those of the Ohio State Highway Department.

Reopen Cement Plants

MEDUSA PORTLAND CEMENT CO., started up its Bay Bridge, Ohio, plant after a short shut-down for repairs. The early resumption of operations is the result of demands for cement used in defense construction, according to A. J. Little, superintendent.

•

LEHIGH PORTLAND CEMENT CO. has resumed operations at its Alsen, N. Y., plant which had been closed since November 26 when the storage silos collapsed.

•

MONOLITH PORTLAND CEMENT CO. is again in full production at its Laramie, Wyo., plant, according to Superintendent F. J. Anderson. This season's shutdown was one of the shortest in years.

•

SUPERIOR PORTLAND CEMENT, INC., has started up its kilns at the Concrete, Wash., plant. Commercial demands for building are expected to call for substantial quantities of cement.

•

CONSOLIDATED CEMENT CORPORATION has reopened its Fredonia, Kans., plant after repairs had been made and a change-over in power system had been completed. This company is now purchasing electric power and has shut down its gas engine power plant.

Slag Concern Making Ready Mixed Concrete

BIRMINGTON SLAG CO., Birmingham, Ala., has placed in operation a new ready mixed concrete batching plant at East Gadsden to furnish concrete by mixer trucks for the new government shell plant. Crushed stone for the batching plant will come from Alabama City while sand will be obtained from Anniston. The plant also will furnish concrete for a new housing project planned for Gadsden and Fort McClellan. Eight trucks are used at the Alabama City plant while three will be used in East Gadsden.

Longer Life for Concrete

AT A RECENT CONFERENCE in Denver, Colo., western cement manufacturers, Portland Cement Association officials, and representatives of the United States Reclamation Bureau have set up new specifications regarding alkali content in cement, which has introduced a new problem for cement manufacturers. The experts in attendance at this meeting included: F. R. McMillan, Chicago, director of research, Portland Cement Association; P. H. Bates, Washington, D. C., National Bureau of Standards; Raymond E. Davis, University of California, Dr. Chas. P. Berkey, Columbia University; S. O. Harper, Garner A. Beckett, and R. F. Blanks.

Installing Equipment for White Cement Plant

CARRARA PORTLAND CEMENT CO. of California is installing a kiln at its plant near Beatty, Nev. The kiln was obtained from the Chief Consolidated Mining Co., Eureka, Utah. The Carrara concern plans to make a white cement.

Add Sixth Ready Mix Unit

THE RICHTER CONCRETE CORPORATION, Cincinnati, Ohio, opened a new plant at Lockland, Ohio, to provide ready mixed concrete in construction work at the Wright airplane plant. J. J. Warner, general manager, said that the new plant would provide more than 75,000 cu. yd. of concrete for this project. Jacob Vorherr was appointed superintendent of the plant. Five other units are operated in Greater Cincinnati territory.

Allis-Chalmers' Strike Issue

MAX W. BABB, president of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., has sent a letter to stockholders and to the press, describing frankly the point at issue in the strike of the C.I.O. local union, which has been on since January 22. The issue is the same that the Ford Motor Co. stands on—namely opposition to a closed shop with compulsory union membership.

"Settlement of this strike has been made unusually difficult because the union apparently is handling it as a 'test case' to use the national defense emergency to gain a purely union organizational advantage, which it calls 'union security'," writes Mr. Babb.

"Simply stated, the union seeks a contract which would require us to discharge employes merely because they are not members of the union in good standing.

"By making a man's job dependent upon union membership, the union leaders seek ultimate control of production. The seriousness of such a threat is evidenced by the fact that we had eighteen work stoppages in the eight months just prior to the strike.

"It is vitally important, therefore, in the interests of efficient production for national defense, profitable operation for our stockholders, and the maintenance of peaceful shop conditions for our workers, that we maintain proper control of our plant.

"In our present strike, it is believed that all questions in dispute, other than the one of union security, could be settled without serious difficulty.

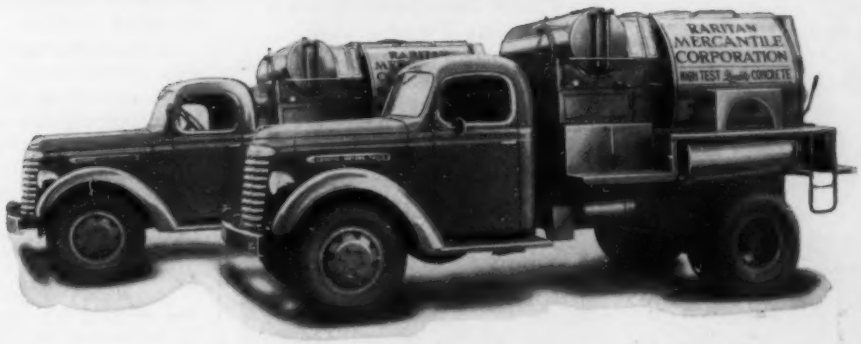
"As you know, our company is not opposed to unionization or to contracts with this union. There is nothing in our company's position which in any way interferes with the union obtaining 100 percent membership in our plant *IF our employes of their own free will all want to join the union.*

"But we should not grant any union the right to force our employes into joining their organization.

"Since the beginning of our negotiations with the union, we have made it clear that *no man's job at Allis-Chalmers shall depend upon membership in any labor organization.*"

Since the above letter was sent out, according to newspapers, above half the votes cast for the strike were found to be fraudulent. The state labor department may insist on a new ballot.

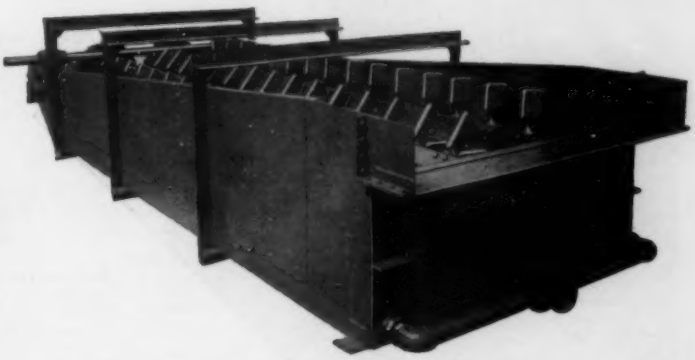
If you're looking for HIGH QUALITY CONCRETE
INVESTIGATE *Ransome* Truck Mixers



Operators have discovered that RANSOME TRUCK MIXERS and Agitators deliver a higher quality concrete. Ransome will be happy to give you the reasons for this superiority. Write for this information and literature.

RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN, NEW JERSEY

EAGLE WASHERS
Protect Your
PROFITS!!



Increased production and sales resulting from the "all out" Defense Construction program will mean extra profits, providing they are adequately protected. Ever increasing problems of *dewatering* and *retention* of fines, combined with State and Federal specifications may necessitate a special machine to give the desired results or fit a limited space.

The Eagle Iron Works' engineers are constantly designing new machines to fit *each* individual case. During the past year we have co-operated with many plant managers, assisting them in profitably solving their washing problems.

Our years of experience in serving the sand and gravel industry has qualified us to authoritatively advise any producer who is now being confronted from day to day with new problems.

For further particulars of our service write us today.

EAGLE IRON WORKS
DES MOINES . . . . . IOWA

New Concrete Products Plant

WORRALL BROS., Louisville, Ky., is building a new concrete products plant on the eastern side of the city, where the greatest building activity is in progress. The new plant will be one of the finest in the country and is being built new from the ground up.

Capacity will be 5000 units daily. This is double the existing production in the old plant, which will probably be dismantled at some future date. The new plant will have a modern vibrating machine, cinder-crushing and grading equipment and steel bins for aggregates. The old location was inadequate for stockpiling room. The company manufactures cinder block and sand and gravel block.

Another Increase Shown in Cement Production

BUREAU OF MINES reports that the portland cement industry in February, 1941, produced 8,368,000 bbl., shipped 7,472,000 bbl. from the mills, and had in stock at the end of the month 25,316,000 bbl. Production and shipments of portland cement in February, 1941, showed increases of 66.0 and 52.3 percent, respectively, as compared with February, 1940. Portland cement stock at mills were 2.2 percent lower than a year ago. All manufacturing plants except one reported for which an estimate was made in lieu of actual returns.

In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 156 plants at the close of February, 1941, and of 159 plants at the close of February, 1940.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	Febr. 1940	Febr. 1941	Jan. 1941	Dec. 1940	Nov. 1940
The Month	24.8	43.5	42.4	51.2	60.1
12 Months	47.8	54.4	53.1	50.6	49.9

Sand-Lime Brick Production and Shipments

ELEVEN active sand-lime brick plants reported for February and eleven for January, statistics for which were published in March.

AVERAGE PRICE FOR FEBRUARY

	Plant Price	Delivered Price
Detroit, Mich.	....	$15.50
Grand Rapids, Mich.	....	14.00
Milwaukee, Wis.	$10.00	12.00
Saginaw, Mich.	11.00	....
St. Louis Park, Minn.	8.43	9.93
Seattle, Wash.	15.00	16.00
Sebewaing, Mich.	10.00	....
Syracuse, N. Y.	14.00	20.00* 16.00**
Watertown, Mass.	12.50	13.50

* Less than 15M. ** More than 15M.

STATISTICS FOR JANUARY AND FEBRUARY

	†January	‡February
Production	2,111,860	1,795,600
Shipments (rail)	249,000	129,000
Production (truck)	2,022,571	1,614,702
Stock on hand	1,850,475	2,139,375
Unfilled orders	1,945,000	2,165,000

† Eleven plants reporting: incomplete, two not reporting production, two not reporting stock on hand, and seven not reporting unfilled orders.

‡ Eleven plants reporting: incomplete, three not reporting production, three not reporting stock on hand and six not reporting unfilled orders.

Concrete Pavement Yardage

AWARDS of concrete pavement for February, 1941, and the first two months of 1941 have been announced by the Portland Cement Association as follows:

	Square yards awarded during February	first 2 months
Roads	818,645	3,632,162
Streets and Alleys	1,037,388	2,358,708
Airports	227,173	1,058,977
Total	2,083,206	7,049,847

TRADE DEMPSTER DUMPSTER MARK

Reg. No. 333,486

The Original Bucketrux

The demand for DEMPSTER-DUMPSTERS has increased in proportion to the "All-Out" orders in industry.

2½ Cu. Yds.

The BUCKETRUX is designed in size to meet the requirements of the job.

Quarry Operators — Lime and Cement Plants — realize that Efficiency today means Results in terms of Production.

2 Cu. Yds.

3 Cu. Yds.

Furnished in capacities of 4500 lb. to 12,000 lb. — Pay Loads — for each respective detachable bucket.

Built to Endure—the BUCKETRUX has no equal.

4 Cu. Yds.

Tilt-Type

Drop-Bottom

All Types of Detachable Buckets Handled with Standard Dumpster Hoisting Unit.

DEMPSTER BROS. INC. KNOXVILLE TENNESSEE

PRICES BID
Contracts Let

EDGERTON, WIS.: Edgerton Sand and Gravel Co. was awarded a contract for approximately 900 tons of sand at 88c per ton and 1300 tons of gravel at 98c per ton to be used in the construction of the combined high school, gymnasium, guard armory and community building in Stoughton.

•

BURLINGTON JUNCTION, MO.: Concrete Materials & Construction Co., Cedar Rapids, Ia., has been awarded the 1941 contract for limestone deliveries to farmers coöperating in the Nodaway county farm program. The cost will be $1.99 per ton delivered and spread on the field, $1.69 delivered to the farm, and $1.35 at the quarry.

•

KENTON, OHIO: Mississippi Lime Co. was low bidder for 400 tons of lime to be used in the municipal water softening plant during the coming year. It bid $9.65 per ton.

•

AUSTIN, TEX.: Travis county commissioners have awarded contracts to R. E. Janes Gravel Co., Inc., Ricks Gravel Co., and Robinson Sand and Gravel Co. to furnish gravel for one year beginning Feb. 15. The county will buy up to 2000 cu. yd. concrete aggregate, 1½-in. to ¼-in. at $1.25 per cu. yd. and 2000 cu. yd. concrete sand at 75c per cu. yd.

•

CARROLLTON, OHIO: Standard Slag Co., Youngstown, was awarded a contract to furnish 16 carloads of slag at $1.66 per ton to be used for the county road program.

•

MARTINS FERRY, OHIO: Universal Concrete Pipe Co. of New Martinsville has been awarded a contract for 700 ft. of 36-in. concrete culvert pipe at $3.94 per ft.

•

NOBLESVILLE, IND.: Contracts were awarded for the purchase of gravel to be used on roads of the county. Baker Gravel Co. will furnish 2000 cu. yd. at 75c per yd.; Ben Hoffman, 3000 cu. yd. at 75c; Wesley Williamson, 2500 cu. yd. at 75c; John Rupe, 2500 cu. yd. at 70c; and Generous Michaels, 5000 cu. yd. at 78c.

•

NEW ORLEANS, LA.: U. S. Engineers Office received low bid from Servtex Materials Co., New Braunfels, Tex., for furnishing 220,000 tons of stone at $2.74 a ton to be shipped from Granite Mountain, Tex., for maintenance and improvement of existing river and harbor work.

•

APPLETON, WIS.: William Winkler received a contract for 600 cu. yd. of gravel at 91c per yd., and Frank Huss received a contract for 200 cu. yd. at 90c per yd.

•

KANSAS CITY, MO.: Stewart Sand and Material Co.'s bid of $7.10 per cu. yd. was low for 1310 cu. yd. of ready mixed concrete to be used for a street widening job. For 420 cu. yd. of concrete for sidewalks and curbing on the same job the J. Shaw Co. bid low at $7.105 per cu. yd. Stewart Sand & Material Co. also bid low on 775 tons of sand at 85c a ton.

Universal Atlas Gets 1,200,000 Bbl. Contract

UNIVERSAL ATLAS CEMENT CO. has been awarded the contract for furnishing 1,200,000 bbl. of cement for construction of the Norfolk dam on the north fork of the White River in Baxter county, Arkansas. The cement will be furnished from the company's Independence, Kan., plant at $1.4832 per bbl. f.o.b., with a shipment cost of $.6768 per bbl., bringing the total cost of cement to $2,472,000.

Made of Acid Open Hearth Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
Established 1857
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Make Your Screening Surfaces More Effective with

HARRINGTON & KING
PERFORATED
METAL SCREENS

Their perforations are properly spaced to give greatest capacity without loss of strength and durability. Any size, any shape, any metal, any perforation.

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★ MANGANESE STEEL CASTINGS ★

for
CRUSHERS
PULVERIZERS
ROLLS
SCREENS

for
SHOVELS
DREDGES
CRANES
CONVEYORS

The Frog, Switch & Mfg. Co.
Established 1881 CARLISLE, PA.

Industrial Sand

A PRELIMINARY OUTLINE of the National Industrial Sand Association convention program has been announced by Executive Secretary V. P. Ahearn. The meetings will be held at The Homestead, Hot Springs, Va., June 19 and 20. A considerable part of the program will be devoted to a discussion of the industry's position at that time with particular reference to the national defense program. Another convention report will cover the recent negotiations in the Ottawa-Wedron fields between members of the industry on the one hand and representatives on the other of the Federation of Glass, Ceramics, and Silica Sand Works of America. Stanton Walker, consulting engineer for the Association, will have an interesting paper on "Reproducibility of Tests of Foundry Sands."

Lime

THE NATIONAL LIME ASSOCIATION in a recent bulletin called attention to a clarifying statement by the U. S. Department of Labor which held that wage-and-hour provisions of the Walsh-Healey Public Contracts Act do not apply to sub-contractors. Subcontractors are subject only to one provision of the Act; namely, that prohibiting performance of work in surroundings or under working conditions which are unsanitary or hazardous to the health and safety of employes.

Crushed Stone

ADMINISTRATIVE DIRECTOR J. R. Boyd of the National Crushed Stone Association has sent out a bulletin which gives the working arrangement for the operation of the national defense priorities system. A system of symbols designates the order of priority. For example, AA is reserved for emergencies of an exceptional nature; A-1-a, up to A-1-j are designated priorities of progressively less urgency; and then follow similar classifications in A-2 up to A-10. As between contracts and orders in the same subdivision (as A-1-c), except as otherwise specifically requested by the Director of Priorities, the date of delivery contracted for will determine the order of precedence.

Ready Mix Directors Meet in Chicago

EXECUTIVE SECRETARY, V. P. Ahearn, of the National Ready Mixed Concrete Association has announced that the semi-annual meeting of the Board of Directors will be held at the Palmer House, Chicago, Ill., on Wednesday, June 25. The meeting will start at 9::30 a.m., Chicago time.

HAUL BIGGER LOADS

GET MORE TRACTION

SAVE ON EVERY TON-MILE

For real pulling power TWO driving axles under the load are far better than one.

With the THORNTON four-rear-wheel DRIVE, in addition to increased capacity and traction you get more flexible operation since you have two transmission ratios—one for power and one for speed. Your investment in equipment is 25 to 40% less, your operating and upkeep costs are from 30 to 50% lower. With THORNTON "Walking-Beam" spring design less shock reaches vehicle and load.

We can show you how to save with a truck equipped with THORNTON four-rear-wheel DRIVE. Users in scores of industries are lowering costs.

THORNTON TANDEM COMPANY

8701-8779 GRINNELL AVE.
DETROIT, MICH.

"When you need TRACTION you need THORNTON"

COMING CONVENTIONS

National Concrete Burial Vault Association, Stevens Hotel, Chicago, May 13, 14 and 15.

National Lime Association, The Homestead, Hot Springs, Va., May 28 and 29.

National Industrial Sand Association, The Homestead, Hot Springs, Va., June 19 and 20.

American Society for Testing Materials, Palmer House, Chicago, June 23 to 27.

National Cinder Concrete Products Association, Atlantic City, N. J., August 4, 5, and 6.

Purchase Quarry

MIAMI STONE Co., Toledo, Ohio, has purchased the Herman Irey quarry south of Marion, Ohio. Pumping of water from the quarry has been started, and it is expected that operations will start early in April. The Miami Stone Co. is a subsidiary of the France Stone Co., Toledo, Ohio. For the present the affairs of the Irey quarry will be handled through the local office of the Marion Stone Co., another France Stone Co., subsidiary.

Trucks to Replace Rails

BASIC DOLOMITE, INC., Cleveland, Ohio, has plans to step up production to meet the demands of the steel industry. Two large crushers will be installed in the Maple Grove quarries near Tiffin, Ohio, and the electrically-operated quarry car transportation system will be replaced with motor trucks. Four large concrete silos will be erected to store finished products.

Oppose Great Lakes-St. Lawrence Seaway

AT A RECENT CONFERENCE of Huron Portland Cement Co., officials at Alpena, Mich., J. A. Bezotte, office manager of the company, spoke in opposition to the proposed Great Lakes-St. Lawrence waterway as a defense measure. He pointed out that cement is a natural ballast for ocean-going ships, and vessels could haul it from Europe into the Great Lakes area for practically nothing if the seaway were built. The money necessary for the project could better be spent for emergency defense measures, he said, as the project would take from four to six years to complete.

Plant superintendents in attendance for a discussion of operating, technical, and safety problems included: E. C. Jacobsen, Detroit; F. C. Floreck, Cleveland; Carl Christiansen, Duluth; D. H. Crigger, Milwaukee; W. C. Nuhn, Buffalo; R. H. Knitter, Toledo; J. C. Tremaine, Saginaw; N. M. MacDonald, Oswego, N. Y.; Leonard Johnson, Muskegon, Mich., and C. S. Ten Brook, Green Bay, Wis. Company executives included: E. M. Ford, vice-president and treasurer; W. W. Crapo, secretary; P. H. Townsend, general manager; C. R. Perry, chemical engineer, and R. H. Schwemm, manager, Huron Transportation Co.

•

BIRMINGHAM SLAG CO., Birmingham, Ala., has leased the Holston quarry in Tennessee to supply aggregates to TVA's Cherokee Dam at Jefferson City, Tenn.

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KEYSTONE
REGISTERED U. S. PATENT OFFICE

MODEL 51

BLAST HOLE DRILL

Is a new and better answer to one tough problem of quarry operators and rock cutting contractors.

It is a night-and-day rock fighter with more built-in power, shock endurance and well drilling science than you have ever seen in a well drill up to now.

It has a welded and riveted steel frame, bigger shafts and bearings, distinctive tool-guide, power derrick-raiser, mast-head shock absorption, Keystone spudding system and stroke adjustment, dependable traction with convenient independent crawler control for easy steering and many other good features of design.

What makes a good blast hole drill? We print a booklet that tells the answer. It will interest you, make money for you. Ask for it.

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THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

High in efficiency. Low in maintenance and power consumption.

Furnished in sizes to suit your operation. Send full particulars for recommendation.

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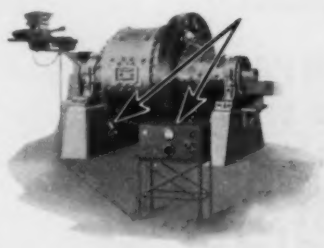
"ELECTRIC EAR"



Most revolutionary development in grinding practice that has occurred for 20 years. Actually increases mill capacity 10 to 20% by controlling feed rate by the mill sound. Bulletin 42.

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COMPANY, INCORPORATED - YORK, PENNSYLVANIA
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DEFENSE

AGAINST COSTLY MINE DEWATERING LINES!

● Here is *one* light-weight pipe built for heavy-duty service. Naylor's exclusive Lockseam Spiralweld provides the extra structural strength, leak-tightness and safety needed for loads usually requiring heavier-wall pipe. Thus, you can install Naylor for both high and low pressure lines and still get the savings of light-weight pipe. Sizes from 4" to 30" in diameter. Complete fittings and fabrication service to meet any mine requirement.

Write for Naylor Catalog or send specifications for quotation.

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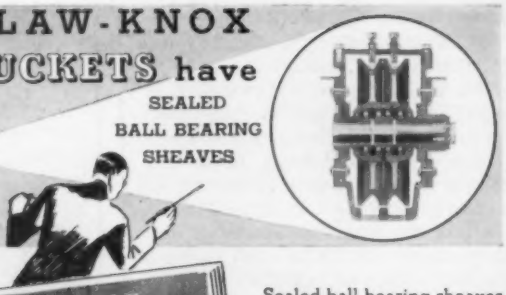
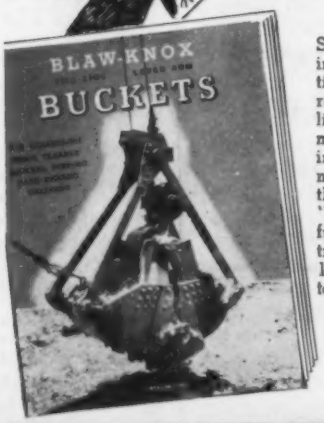
NAYLOR LOCKSEAM SPIRALWELD **PIPE**

BLAW-KNOX BUCKETS have
SEALED
BALL BEARING
SHEAVES





Sealed ball bearing sheaves in the lever arm reduce lost time and expense of bearing replacement, increase cable life and reduce friction, materially improving operating efficiency. This, and many other better features, that make BLAW-KNOX the "wise" buy in buckets are fully explained and illustrated in NEW CATALOG 1757. Send for your copy today.

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29

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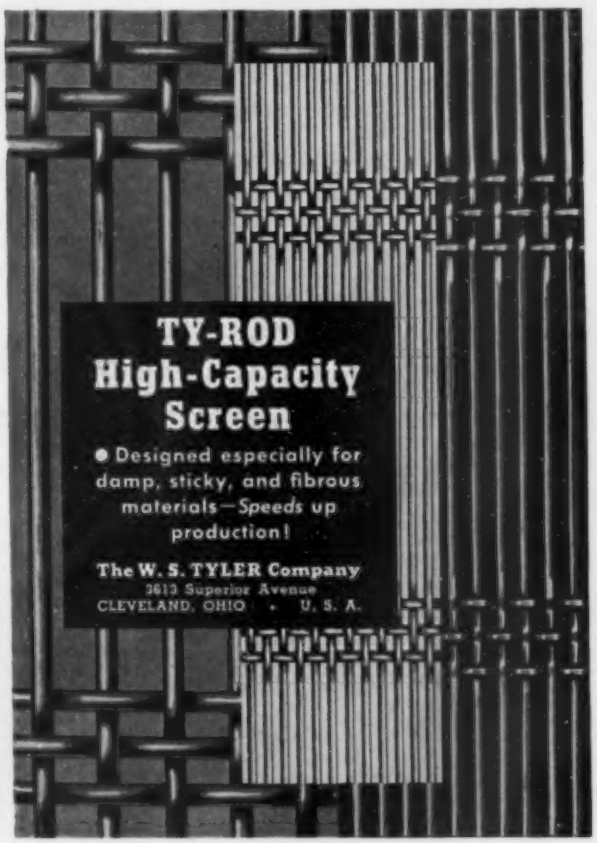
BUCKETS

BLAW-KNOX BINS AND BATCHERS • ROAD FORMS • STREET FORMS • CONCRETE SPREADERS • TAMPING ROLLERS • VIBRATORS
CONCRETE BUCKETS • CLAMSHELL BUCKETS • TRUCK MIXERS • STRIPING MACHINES • TURNTABLES • ROAD FINISHERS • STEEL FORMS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FREE! New Literature

THE bulletins and catalogs described below are for your benefit. To save you the necessity of writing individual letters, those you want can be obtained by merely checking and mailing the coupon on next page.

1 ALLOY STEEL.—Bethlehem Steel Co. Catalog 156 is a 31-page catalog of Bethlehem's Mayari R alloy steel, which contains, along with many illustrations of applications, data and information about its features. There are also suggestions on welding Mayari R.

2 BEARINGS. — Link-Belt Co. Complete information about the renamed line of Link-Belt "friction-fighter bearings" is given in the 88-page data book No. 1775. It includes information on where and why to use different types for each class of service, tables of load ratings and minimum life expectancies, and other engineering information.

3 BEARING GREASES.—Gulf Oil Corp. has literature on its two new lubricating greases for ball and roller bearings described in the New Machinery and Equipment Section. One is recommended for heavy duty service, the other for lighter duty and higher speeds.

4 BITUMINOUS CENTRAL MIXING PLANTS. — Barber-Greene Co. Bulletin 836 is a 24-page illustrated report on Barber-Greene bituminous central mixing plants. It presents essential facts on four actual jobs including laboratory mix analyses. The illustrated section discusses the fundamental principles and operating details of the continuous mixer.

5 BLAST HOLE DRILL.—Keystone Driller Co. has literature giving complete information about the new Model 51, crawler-mounted blast hole drill which employs a combination of welding and riveting in the structural framing. This driller is described in the New Machinery and Equipment Section.

6 CLAMSHELL BUCKETS. — Blaw-Knox Co. has issued a 76 page catalog No. 1757 on its series of two-line lever arm clamshell buckets. The 245 buckets are listed in a consolidated table according to rated capacity, ranging from 1/3 to 7½-cu. yd. There is an explanation of the three principles of multiplying power in a bucket and how to select a clamshell bucket.

7 CLASSIFIERS.—Hardinge Co., Inc. Bulletin No. 31-C is an illustrated booklet presenting the operation, features and structural qualities of Hardinge thickeners, clarifiers and agitators. Featured are several pages about the new "Auto-Raise" drive mechanism.

8 COMPRESSOR.—Clark Bros. Co., Inc., has issued a circular about its new line of steam-driven compressors. This line is available in sizes from 600 to 4000 hp., and its design is based on the Clark right angle, gas engine driven compressor design.

9 CONCRETE BLOCK MACHINE.—Concrete Transport Mixer Co., Inc., has issued a circular about the new Kirkham vibrator. Among the features claimed for this machine are low initial and operating cost, a heavy steel plate mold box insulated from the frame with rubber, and its ease of installing and operating.

10 CONCRETE BLOCK MACHINE.—Kent Machine Co. has issued a circular about the new Kent automatic, hydraulic Vibra-Press. Its features and operation are described. Vibration, applied by hydraulic power, is entirely within the mold box and is insulated from the rest of the mechanism.

11 CONCRETE BLOCK MACHINE.—Kramer Corporation has issued a circular describing the Kramer Pak-Crete concrete block machine. The circular emphasizes four money-making advantages of this machine. An illustration of the machine with encasing structure removed helps describe its mechanical features.

12 CONCRETE BLOCK MACHINE.—Multiplex Concrete Machinery Co. has issued a circular presenting the new Multico pneumatic vibra-tamp-press block machine, which provides a complete cycle of automatic operation by the push of one button. Tamping power is adjustable from 1 lb. to 2800 lb., and the unit may be operated by compressed air or electricity.

13 CONCRETE BLOCK MACHINE.—Stearns Manufacturing Co. Sheet No. 50 describes the operation and features of Stearn Joltcrete machines. Views of a number of plants where the machine is used are shown, and the automatic operation cycle, giving a maintained output of more than 9 block per minute, is shown in a panel of illustrations.

14 DIESEL ENGINES.—Cummins Engine Co. has issued a 36-page bulletin No. 5182 describing and illustrating the entire line of Cummins heavy duty Diesel engines.

15 CONVEYING SYSTEMS.—Stephens-Adamson Mfg. Co. Catalog 140 contains 60 pages of information about Redler conveyors. The catalog includes a discussion of the advantages of Redlers for conveying and elevating materials en masse, diagrams of typical arrangements of Redlers and detailed information about actual installations.

16 DREDGE BUCKETS. — American Manganese Steel Division has issued bulletin No. 1140 describing the features of Amsco rivetless lip dredge buckets made of Amsco manganese steel. Twelve points of superiority are presented.

17 DREDGE BUCKETS. — Taylor-Wharton Iron and Steel Co. has brought out a circular about the Tisco rivetless buckets. The Tisco bucket design embodies positive locking lip ends and a flexible tongue pin lock.

18 DRYER.—Link-Belt Co. has issued a new catalog and engineering data book No. 1911 on its Roto-Louvre dryer. In addition to the information and data contained it also has many photographs and drawings of typical installations.

19 DRYER.—Western Precipitation Corp. Bulletin D-1 contains details and illustrations about the new Turbulair dispersion dryer, which is described and illustrated in the New Machinery and Equipment Section.

20 HEATER.—Littleford Bros. has literature about the features and application of the "Tankar" heater, a compact oil-burning steam generator applicable to heating of aggregates and mixing water in ready-mixed concrete batching plants.

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21 LIGHTWEIGHT AGGREGATES.—Haydite Manufacturers' Association has prepared an illustrated circular about Haydite lightweight aggregate which tells how Haydite is made, its physical properties and uniformity. Illustrations of a number of structures made with Haydite units are also included.

22 LOADER.—Athey Truss Wheel Co. has issued a circular describing its new Mobi-Loader. Numerous illustrations show how it operates under a variety of conditions. Mounted on a tractor, the loader digs, elevates and dumps loads to its rear without turning.

23 MATERIAL HANDLING.—R. G. LeTourneau, Inc. Folder A-14-1-41 is an 8-page circular about LeTourneau carryalls, bulldozers, cranes and rooters. Actual job photos are used to show this equipment operating in different phases of overburden removal, stock piling, recovery of tailings and materials handling.

24 PORTABLE PLANTS.—Diamond Iron Works, Inc. Circular D-41-G is about the Diamond Rotor-Lift portable crushing and screening plants. Various working parts, such as crusher, screens, hoppers and the Rotor-Lift for effectively circulating material in a minimum of space are described in detail.

25 POWER DRAG SCRAPERS.—Sauerman Bros., Inc. "How to Cut Costs of Storing and Reclaiming Bulk Materials" is the title of a new bulletin No. 153. It contains more than 50 photographs of Sauerman drag scraper machines handling varied materials. All the jobs illustrated are accompanied by diagrams of the general plan and sectional elevation.

26 MOTORS.—General Electric Co. "How to Maintain D-C Motors" contains many helpful tips and includes information on proper motor selection, motor inspection and servicing, and overhauling and repairs. It also contains a trouble correction chart for d.-c. motors.

27 PORTABLE CONCRETE HOPPER.—Butler Bin Co. has issued a circular which contains illustrations of the Butler concrete hopper in service for transfer of concrete from trucks to the job. The structural features and capacities of this hopper are also described in detail.

28 PORTABLE PLANTS.—Smith Engineering Works has issued a folder about the Telsmith dual portable crushing and screening plant. Outstanding features are described and illustrated in detail and there are several large illustrations of the plant operating.

29 POWER UNITS.—Hercules Motors Corp. has issued a new power unit catalog and application field book, containing information on the entire line of Hercules gasoline and Diesel-power units and data on the proper selection and use of power units.

30 PRECAST FLOOR AND ROOF SLABS.—Price Bros. Co. has issued a booklet about Flexicore floor and roof slabs, their structural features, ease of application and appearance when used. The booklet is profusely illustrated.

31 SHUTTER PICKER.—Hendrick Manufacturing Co. has available literature giving complete information about the shutter picker described in the New Machinery and Equipment Section.

32 PULVERIZER.—Universal Crusher Co. Bulletin No. 400 is about the construction features of the Universal steel plate, roller bearing hammer mills. Included are sections on the use of Universal pulverizers for making agricultural limestone and for making commercial aggregates.

33 REFRACTORIES.—Geo. P. Reintjes Co. Bulletin No. 401 tells "How to stop upper side wall air infiltration" with the Reintjes drum sealing ring and squaring tile. It also contains information about Reintjes refractories including 14 features and factors in selection.

34 RUBBER PRODUCTS.—Hewitt Rubber Corp. "Hewitt Rubber Products for Industry" is a profusely illustrated, 34-page booklet about diverse and trying applications being made of Hewitt rubber hose and belting.

35 SAND AND GRAVEL PLANT EQUIPMENT.—Eagle Iron Works. Bulletin No. 41 illustrates and describes the complete line of Eagle equipment for plant operation, sand and gravel washing equipment, dewaterers, sand tanks, sand drags, and roll crusher. Also included are numerous views of this equipment in action.

36 SCREENS.—Hendrick Mfg. Co. has issued a circular about the operation, application and features of the new Hendrick screens for sizing and dewatering which vibrate by two separate and distinct actions of shaking and whipping.

37 SKIP BUCKET.—Pioneer Engineering Works. Form 535 describes and illustrates the new Pioneer Trukbukit for transporting materials in detachable buckets. The trukbukit also can be readily converted to a hoisting unit.

38 TRACTOR.—Caterpillar Tractor Co. has literature about its new 55-hp. Diesel tractor, the D6, which is described and illustrated in the New Machinery and Equipment Section.

39 TRUCKS.—Four Wheel Drive Auto Co. has available literature describing the new line of trucks. A description and illustration of this line appears in the New Machinery and Equipment Section.

40 TRUCK MIXERS.—Ransome Concrete Machinery Co. New 8-page bulletin No. 175 is a pictorial presentation of the Ransome truck mixers and agitators—their features and operation. Also included are a number of illustrations showing Ransome mixers in action.

41 TRUCK MIXERS.—T. L. Smith Co. "Smith-Mobile on the Job," bulletin No. 203, is a large folder of pictures showing where Smith-Mobiles are being used. It also reproduces a number of testimonials from users.

42 VALVES AND COUPLINGS.—Knox Manufacturing Co. A new catalog No. 14 describes and presents data on the complete line of Knox throttle and air line valves, couplings, hose connections and related equipment to control the flow of water and compressed air.

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(4-41)

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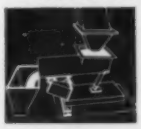
Large and Small Models—Adjustable Power.
All Built for Continuous 24 Hour Duty.



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Capacities from POUNDS TO 200 TONS Per Hour. With Finger Tip Rheostat Control of Rate of Flow of Bulk Materials.

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FOR DRY CHEMICAL REAGENTS, ETC.
With Vibrated Supply Hoppers and Rheostat Controlled "Vibra-Flow" Feeders.

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GRAVIMETRIC FEEDERS
For ACCURATE FEEDING BY WEIGHT. "Vibra-Flow" Feeder Keeps Constant Load on Scale Suspended, Constant Speed Belt.

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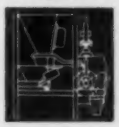
Extremely Accurate NET BATCH WEIGHING EQUIPMENT. Scale Mounted, Dumping Hopper Controls "Vibra-Flow" Feeder.



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SETTLE AND COMPACT MATERIAL IN BARRELS, DRUMS, CARTONS, CANS, BAGS, JARS, ETC.
Large and Small Models—Adjustable Power.

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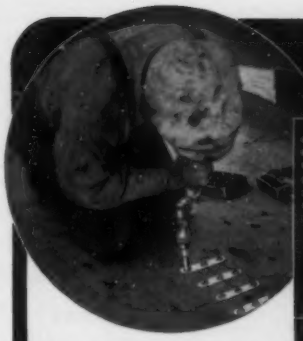

Typical repairs and patches made with Flexco HD Rip Plates.

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

Flexco HD Rip Plate

Flexco HD Belt Fastener

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FLEXCO HD BELT FASTENERS
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STEAM • GASOLINE • DIESEL
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MECHANICAL or ELECTRIC DRIVE

—is assured with Davenport Locomotives on the job. Sturdy—Efficient—Lasting, Davenports, designed with the latest features are your BEST BUY. Available in the size and type most perfectly suited to your needs. Forty years of proven merit are your assurance of profit-wise satisfaction.

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Davenport engineers will consider it a privilege to assist you in thoroughly analyzing your haulage requirements.

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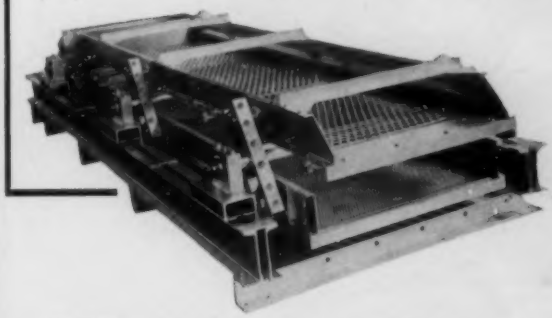
THE *New* FLAT SCREEN
that shakes as it whips



IDEAL for sizing and dewatering . . . the only screen with two distinct actions—shaking and whipping. Perfectly balanced; no vibration. Operates in a level or uphill position.

Write for booklet containing complete data.

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PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

MARTINDALE PROTECTIVE MASKS

weigh less than ½ ounce

PLACE HEAD-BAND WELL UP AROUND HEAD TO KEEP FROM SLIPPING DOWN
PRESS NOSE TABS IN CLOSE AGAINST FACE TO HOLD PAD AGAINST THE NOSTRILS
PRESS EDGES OF FACE PLATE DOWN TO FIT FACE SNUGLY

Made of soft rolled aluminum so pliable that they fit closely over the nose and mouth.

Not recommended for toxic dusts, but give excellent protection from such dusts as lime and limestone, coal, and cement.

1 Mask and 25 Refills. . . . $1.23
4 Masks and 100 Refills. . 4.25
6 Masks and 150 Refills. . 5.40

MARTINDALE ELECTRIC CO.
1409 Hird Ave., Cleveland, Ohio

Traffic and Transportation

***PROPOSED RATE CHANGES**—The following are the latest proposed changes in freight rates up to and including the week of March 15:*

Central

65816. **Stone, crushed,** in bulk, in open top cars, C. L. Establish on, from Osgood, Ind., to Wirt, Ind., 60c per net ton.

65884. **Limestone,** ground or pulverized, unburnt, C. L., min. wt. 60,000 lb. Establish on, from Greencastle, Ind., to various pts. in Ill., rates as follows: Abingdon 226c, Aledo 237, Arlington 215c, Aurora 204c, Barrington 215c, Batavia 204c, Blodgett (Will County) 193c, Buda 226c, Cambridge 226c, Cardiff 187c, Chenoa 193c, Chillicothe 215c, Colona 237c, Dixon 226c, Dwight 193c, Earlville 215c, Elmwood 215c, El Paso 193c, Fall Creek 226c, Farmington 215c, Galena 259c, Galva 226c, Genoa 215c, Harvard 226c, Henning 149c, Holcomb 226c, Hopedale 193c, Howe 215c, Keithsburg 237c, Kewanee 226c, Ladd 215c, Lemont 204c, Lewiston 226c, Lomax 237c, Lorenzo 193c, Lostant 204c, Marseilles 204c, Mendota 215c, Minonk 204c, Minooka 193c, Monmouth 226c, Morris 204c, Mundelein 215c, Naperville 215c, Nemo 226c, New Lenox 204c, Nokomis 182c, Oglesby 215c, Peotone 182c, Peru 215c, Plano 215c, Princeton 215c, Richmond (McHenry Co.) 226c, Roanoke 204c, Rock Falls 226c, Romeo 204c, Sandwich 215c, Savanna 248c, Seatonville 215c, Spring Valley 215c, Stockton 248c, Streator 204c, Sycamore 215c, Warren 248c, Whitehall 215c, Zearing 215c.

65913. **Industrial sand,** as per usual descriptions (a), (b) and (c). Establish on, from Evansville, Ind., Group, viz.: Green River Rd., Stacer, Newburgh, Vanada, Briscoe, Yankeetown, Hatfield, Kensington, McCoy, Richland, Sandale, Hardy, Kincaid, Fairview, Feigel, Rockport, Evansville, Patoka, Troy, Tell City, Cannelton and Chrisney, to Burlington: (a) 286c; (b) 315c; (c) 286c per net ton.

65914. **Industrial sand,** as per usual descriptions (a), (b) and (c). Establish on, from Evansville, Ind., Group, viz.: Green River Rd., Stacer, Newburgh, Vanada, Briscoe, Yankeetown, Hatfield, Kensington, McCoy, Richland, Sandale, Hardy, Kincaid, Fairview, Feigel, Rockport, Evansville, Patoka, Troy, Tell City, Cannelton and Chrisney, to Martinsville, Ill.: (a) 176c; (b) 194c; (c) 138c per net ton.

65933. **Slag** (a product of iron and steel blast or open hearth furnaces), and on **crushed stone** and **crushed stone**

American HAMMER MILL CRUSHERS

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screenings, C. L. (see Note 3). Cancel (a) present rate of 77c per net ton on slag as described above, from Buffalo, N. Y., to Wesleyville, Penn., and (b) present rate of 55c per net ton on crushed stone as described above, from Erie, Penn., to Elgin, Penn. Class rates to apply.

65946. **Limestone,** ground or pulverized, unburnt, C. L., min. wt. 60,000 lb. Establish on, from Salem, Ind., to Charlestown, Ind., 121c per net ton, via C. I. & L. Ry., Mitchell or New Albany, Ind., B. & O. R. R.

65950. **Sand** (except industrial) and **gravel,** in open top cars only, C. L. Establish on, from Dundee, Ind., to Ferguson, Ind., 94c per net ton.

65956. **Crushed stone,** in bulk, in open top cars, and **crushed stone screenings** and **tailings** (other than ground or pulverized agricultural limestone), in open top cars, C. L. (see Note 3). Establish on, from Bellevue, O., to Lore City, Gibson, Salesville, Quaker City, Senecaville and Cumberland, O., 149c per net ton, via W. & L. E., Monroeville or Zanesville, O., B. & O.

65988. **Limestone,** ground or pulverized, or **limestone dust,** unburnt, in box cars, C. L., min. wt. 60,000 lb. Establish on, from Greencastle, Ind., to Shipshewana, Ind., 176c per net ton.

65989. **Limestone,** agricultural, unburnt, in bulk, in open top cars, C. L. (See Note 3). Establish on, from Middlepoint, O., to Melbern and Edgerton, O., 105c per net ton, via P. R. R., Fort Wayne, Ind., N. Y. C. (W.).

Trunk

39608. **Sand** (other than industrial) and **gravel,** in open top cars without tarpaulin or other protective covering, C. L. (See Note 3), from Bethlehem, Penn., to High Bridge, N. J., $1.10 per net ton in lieu of current 6th class rate of 12c per 100 lb. (See Note 5).

39611. **Silica** (silex); **tripoli; sand,** silica; powdered or pulverized to such fineness that 90 percent or more will pass through a No. 100 mesh screen (100 openings to the inch), in packages or in bulk, C. L., from Pinewald and Quail Run, N. J., to Chattanooga, Tenn., 31c and Knoxville, Tenn., 29c per 100 lb. (See Note 5).

39634. **Sand** (other than industrial) and **gravel,** in open top cars without tarpaulin or other protective covering, C. L. (see Note 3), from Cleveland, N. Y., to East Ithaca, N. Y., $1.43 per net ton in lieu of current 6th class rate of $3.20 per net ton (see Note 5).

Sup 1 to 39636. **Crushed stone and screenings,** in straight or mixed C. L. (will not include agricultural limestone or ground limestone, unburnt; fluxing

---

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

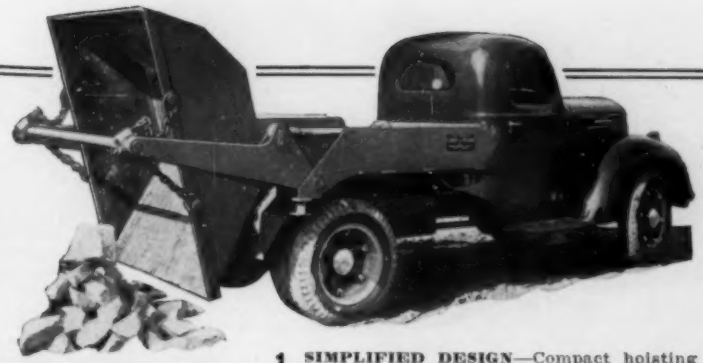
Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.



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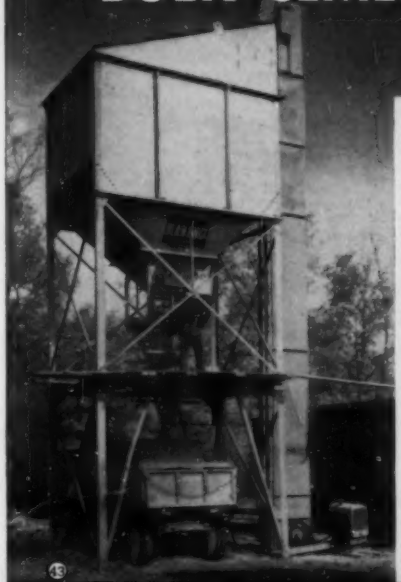

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stone or firestone; or stone coated with oil, tar or asphaltum). (see note 3) from Birdsboro, Penn., to Cleveland, O., $4.40 per net ton. Also Sup 1 to 39645 from Birdsboro, Penn., to Glasgow, Va., $2.86 per net ton.

M.-4344. To increase commodity rate of $4.03 per net ton to $4.60 per net ton on slate, crushed or ground and stone chips or granules, C. L., from Arvonia, Dutch Gap and Esmont, Va., to North Tonawanda, N. Y. Reason: To reflect the proper basis.

39647 (increase). Cancel the following commodity rates on (A) flint, ground, C. L., min. wt. 40,000 lb., and (B) sand, industrial (see Note 3), from Berkeley Springs, Great Cacapon, and Hancock, W. Va., as published in Items 570 and 580 of B&ORR Tariff I. C. C. No. 23288 (rates in cents per 100 lbs.): To Ayers Cliff, Que., (A) 28, (B) 25; Bube Jct., Que., (A) 28, (B) 25; Courtland, Ont., (A) 23, (B) 20; Eustis, Que., (A) 28, (B) 25; Lennoxville, Que., (A) 28, (B) 25; North Hatley, Que., A) 28, (B) 25; Rock Island, Que., (A) 28, (B) 25; Stanstead, Que., (A) 28, (B) 25. (See Note 4.)

39664 (increase). Limestone, ground or pulverized, C. L., min. wt. 60,000 lb., from Jamesville, N. Y., to Wilseyville, N. Y., $1.60 per net ton in lieu of current commodity rate of $1.38 per net ton. Reason: To place rate on proper basis.

39666 (increase) To cancel Item 2880 of B. & O. R. R. Tariff I. C. C. No. 23299, publishing commodity rate of 28c per 100 lb. on building and chemical lime, C. L., min. wt. 36,000 lb., from Huntington, W. Va., to Superior, W. Va. (See note 4.)

New England

53718. Stone, fluxing, min. wt. 80,000 lb. Farnams, Cheshire, North Adams, Renfrew and Zylonite, Mass., to Troy, N. Y. Present, from North Adams $1.54 net ton and from other points $1.60 net ton as per NYC I. C. C. (B&A) 9450; proposed $1 net ton. Reason: Same rate as from Chazy, N. Y.

25016. Fluorspar, C. L., min. wt. 40,000 lb. Establish 32c cwt. from Marion, Ky., and Rosiclare, Ill., to Badin, N. C., and to Alcoa, Tenn., 22c from Marion, Ky., and 24c from Rosiclare, Ill.

Texas-Louisiana

5549. Sand and gravel. Establish a rate of 76c per ton of 2000 lb. on sand (except asbestos sand and silica sand) and gravel, C. L., min. wt. as provided in Item 60 of S. W. L. Tariff 162P, from Texarkana, Ark.-Tex., and Jury, Tex., to Shreveport, La.

5632. Rock, crushed asphalt and stone, asphalt coated. Establish rate of $2.60 per ton of 2000 lb. on straight or mixed C. L. (see Note 3), from Cline, Blewett, Dabney and Whitesmine, Tex., to Shreveport, La.

Southern

24971. Phosphate rock, C. L. Establish 384c net ton, Mt. Pleasant, Tenn., Group 1 stations to Berea, Ky., in lieu of present rates of 384c on crude lump and 421c on ground.

25055. Sand, molding, C. L., establish rates on to (a) Milwaukee, Wis., and (b) to Sheboygan and Kohler, Wis., from Hollow Rock, Tenn., (a) 341, (b) 363; Sawyers Mill, Tenn., (a) 352, (b) 363; Lipe, Tenn., (a) 362, (b) 363; Camden, Tenn., (a) 352, (b) 363; Lexington, Tenn., (a) 352, (b) 374).

25131. Phosphate Rock, C. L. Establish 75c gross ton, Pembroke, Fla., to South Boca Grande, Fla., for export or coastwise movement.

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An Alloyed Manganese Steel
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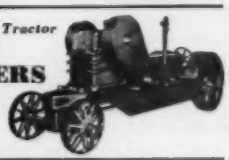

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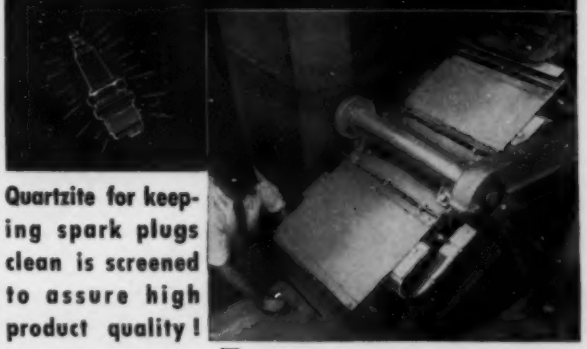

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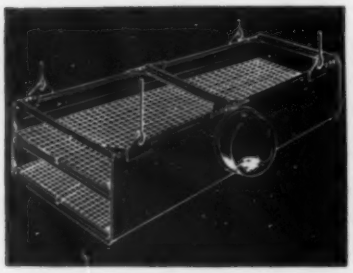

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OBITUARIES

MRS. M. K. LOUNSBURY, treasurer of the Allwood Lime Co., Manitowoc, Wis., died February 27. Mrs. Lounsbury also was director of the National Lime Association from district 8.

She was married to John M. Lounsbury, sales manager of the Allwood

Mrs. M. K. Lounsbury

Lime Co., in 1926. On the death of Mr. Lounsbury in 1932, she became treasurer of the lime company and also headed the Allwood Sales Co.

•

HENRY C. LOGAN, a foreman at the Dolese Bros. Co., Wichita, Kan., plant, died February 6 following an accident. He was 42 years of age.

•

JOHN L. KEATING, retired sand and gravel operator of New York City, died February 19 at the age of 85. He was founder of the John L. Keating Co., New York City, and was president when it merged with the Colonial Sand and Stone Co., Inc.

•

EDWARD A. FOLEY, a representative of the North American Cement Corp., for over 25 years, died February 4 at his home near Albany, N. Y.

•

ROBERT NEAL VAN WINKLE of the American Crushed Rock Co., Delaware, Ohio, passed away January 17.

•

SPENCER K. NORTON, a founder and secretary-treasurer of the Independent Limestone Co., Bedford, Ind., died February 17. He was 61 years of age.

•

JAMES E. PENNYBACKER, managing director of The Asphalt Institute and managing head of its predecessor, the Asphalt Association, since 1919, died February 25 at the age of 63.

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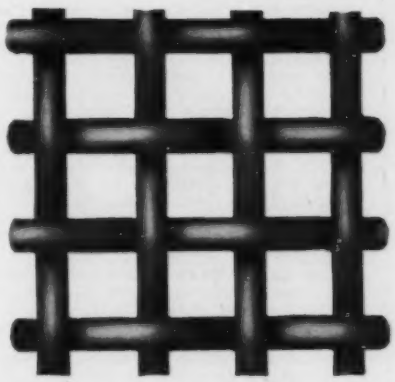

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Mineral Identification

EVERY ONE who operates a mine, quarry or gravel pit, must have some curiosity about the nature of the minerals he uncovers in the bosom of the earth. For such as have enough curiosity to want to find out what some of them are a recent book, "Mineral Identification Simplified," by Orsino C. Smith, president, Los Angeles Mineralogical Society, has been published by the Wetzel Publishing Co., Inc., Los Angeles, Calif. The book seems to be all that its name implies, although to use it requires some knowledge of chemistry. About half the book is composed of tables designed to identify minerals, whose physical and chemical characteristics have been determined. It is pocket size with flexible covers, 271 pp., and the price is $3.50.

New Incorporations

Bryson Talc Co., Marion, N. Car., has been incorporated with an authorized capital stock of 1000 shares no par value by Charles V. Magann, Philadelphia, A. S. Janeway, Atlantic City, and H. J. Bryson, Marion.

St. Laurence Corp. of Newfoundland is a new fluorspar development at St. Johns capitalized at $75,000.

Sand Knob Sand Co., Beckley, W. Va., with its plant in the Jumping Branch district, Summers county, has been incorporated by C. L. Allen, C. C. Lewis and A. K. Canterbury, all of Beckley. Capitalization is $25,000.

Canadian-American Mica Syndicate, Inc., New York City, has been granted a charter. Capital is 200 shares no par value and incorporator is Keesing & Keesing, 250 W. 57th St., New York City.

Dania Rock & Sand Co., Inc., Miami, Fla., has been incorporated with a capital of 50 shares no par value. Directors are P. L. E. Helliwell, Mary Givens and S. K. Bronstein.

Manufacturers' News Notes

Taylor-Wharton Iron and Steel Co., High Bridge, N. J., has recently purchased, for early installation, a new 5-ton Pittsburgh Electromelt furnace of the latest type top-charging design. This installation is part of the modernization program to increase their production of manganese steel and other alloy castings.

Jaeger-Lembo Machine Corp., Corona, L. I., N. Y., has permanently retired the national trophy presented by the Jaeger Machine Co., Columbus, Ohio, to the distributor selling the most Jaeger equipment. Jaeger-Lembo has won the trophy three times in succession.

John A. Roebling's Sons Co., Trenton, N. J., has appointed Ernest C. Low as general manager of sales. With the company for 32 years, he was made manager of the San Francisco branch in 1930 and president and general manager of John A. Roebling's Sons Co. of California in 1940.

Thew Shovel Co., Lorain, Ohio, announces that D. G. Savage, sales manager, has been promoted to general sales manager; M. B. Garber has been appointed assistant sales manager and also will retain his duties as export manager; J. L. Beltz has been appointed manager of sales promotion; R. T. Cobb, who has been Mr. Garber's assistant, becomes sales office manager. H. H. Buchanan has been made western manager of sales.

Chain Belt Co., Milwaukee, has elected J. C. Merwin, vice-president and treasurer, as president to succeed the late C. R. Messinger. G. M. Dyke, assistant treasurer, has been elected treasurer and A. F. Kessler, also an assistant treasurer, has been elected to the new office of comptroller. Mr. Merwin joined the Chain Belt organization in 1917 and has been successively superintendent, works manager, assistant to the president, director, vice-president and treasurer.

J. C. Merwin

General Electric Co., Schenectady, N. Y., announces the election of Harry L. Erlicher as a vice-president. He has been purchasing agent since 1931 and an employe of the company for 40 years.

Chrysler Corporation, Detroit, has appointed J. R. Ackerman director of merchandising and advertising of the Dodge Division. He was formerly a field manager and at the time of his present appointment was director of truck merchandising in Detroit. E. J. McPhee, superintendent of assembly of the Dodge truck division, has been promoted to general superintendent.

Wickwire Spencer Steel Co., New York, N. Y., has appointed Dean Rollans as general sales manager, succeeding A. G. Bussmann, who resigned because of ill health.

Timken Roller Bearing Co., Canton, Ohio, is undertaking a tremendous expansion of its plants. By mid-1941 the total is expected to reach $5,000,000.

John A. Roebling's Sons Co., Trenton, N. J., has appointed Percy Jenkins manager of the Boston branch. He has been associated with the Wickwire Spencer Steel Co. for more than 15 years.

Caterpillar Tractor Co., Peoria, Ill., announces the appointment of James H. Deaderick as assistant general parts manager of the company. Since 1939 he has been assistant sales manager of the western sales division. W. B. Gordon has been appointed parts manager in charge of physical inventory and its control and A. H. Yingst, parts manager in charge of orders, invoicing, distributor contact, etc.

American Foundry Equipment Co., Mishawaka, Ind., reports that Verne E. Minich has retired as president to become chairman of the board. Otto A. Pfaff is now president and remains in the capacity of general manager and Leslie L. Andrus, formerly sales manager, has been made vice-president in charge of sales.

Allis-Chalmers Mfg. Co., Milwaukee, announces that A. E. Bateson, who, until a year ago, was manager of purchases, has retired from active service after completing 50 years with the company.

Lee H. Hill has been appointed assistant manager of the company's electrical department. Since 1936 he has been head of the transformer department.

Hardsocg Wonder Drill Co., Ottumwa, Ia., reports that The Northwestern Road Supply Co., Wahpeton, N. Dak., has been appointed distributor for North Dakota and The Northwestern Sheet & Iron Works, Wahpeton, for South Dakota.

"PENNSYLVANIA" REVERSIBLE HAMMERMILL

preparing 42" Gyratory's output of hard Limestone to size required for the efficient performance of modern Grinding Equipment.

Major crushing by smashing impact,—Automatic Hammer Turning and Resharpening,—Lower Power Demand,—and Sharply cut upkeep cost.

Send for Bulletin No. 1030.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg.
PHILADELPHIA, PA.

PUT YOUR REDUCTION PROBLEMS UP TO US

RYERSON CERTIFIED STEELS

LARGE STOCKS...IMMEDIATE SHIPMENT

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Classified Advertisements

CLASSIFIED RATES

POSITIONS WANTED — POSITIONS VACANT Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

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Williams Roller Mill, for fine grinding.
1 Standard (2 roller) size Mill, complete with fan, cyclone, storage tank, and piping. Ready to install. In almost new condition. Current model.
1 Williams No. 2 Hammer Mill.
Crushers, Gates K, Nos. 6, 8, 10, 12.

F. L. KENDIG
913 South 38th Street
BIRMINGHAM, ALABAMA

DIESEL OIL ENGINES
10 to 1000 Hp. Rebuilt—Guaranteed

15 Hp. FBM. Heavy Wheels	$150.00
20 Hp. FBM Oil Engines	$290.00
25 Hp. FBM Oil Engines	$350.00
40 Hp. Full Diesel Complete	$390.00
80 Hp. Two cylds., Full Diesel Eng.	$750.00
120 Hp. Three cylds., Full Diesel Eng.	$900.00

Many other sizes and makes—Bargain Prices
J. D. ANDERSON MCHY. CO.
Phone 7720 3516 Maple Ave. St. Louis, Mo.

NEW AND USED PIPE FOR EVERY PURPOSE
Large stocks carried everywhere for spot shipment
Jos. Greenspon's Son Pipe Corp.
National Stock Yds. (St. Clair Co.) Ill.

Try a
CLASSIFIED AD
— It Pays —

REBUILT READY FOR IMMEDIATE DELIVERY
1—Austin-Western 15x20 Jaw Crusher No. 2600
1—Austin-Western 3018 Roll Crusher No. 2486
1—IHC PD80 Diesel Engine No. PDJ1475
1—75-A Lorain Shovel 1¼-yd. No. 3417

JOHN W. PATTERSON CO.
324 Fourth Ave. Pittsburgh, Pa.
Telephone Court 1256

FOR SALE
1—Stone Crushing Plant, approximate tonnage 300 tons per day, complete with No. 6 Champion Crusher, Buchanan Double Rolls 20 x 14, inclined elevator 41 ft. centers, 18 x 8 x 11¾" buckets, 42" diameter screen, 24' long.
1—No. 1 Raymond Pulverizer with No. 11 Exhauster Fan, complete with collector, separator and piping.
1—No. 3 Raymond Pulverizer with No. 12 Exhauster Fan, complete with collector, separator and piping.
1—Clyde Hydrator No. 4.
1—Centrifugal Discharge Elevator, steel casing, 80 ft. centers, 7 x 12" buckets.
1—Elevator and steel bin for unloading bulk material in large lumps or large quantities.
1—Complete Hydrating Plant including building.
Address Box 987, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

FOR SALE
1—5'-6"x40'-0" Rotary Dryer.
1—4'-0"x30'-0" Rotary Dryer.
We specialize on Dryers and Kilns of the smaller sizes particularly.
McDERMOTT BROS. CO.
Allentown, Pa.

CRUSHERS
GYRATORY: 42" Gates K, 36" Superior McCully (Like new). 20" Superior McCully. Gates Nos. 12, 10, 9, 8, 7½, 6, 5, 4, 3, 2, 1 (75 avail.) Telsmith Nos. 4, 5, 6, 8C, 9 & 16. Also many Austins, Kennedys and Traylors, many sizes.
JAW TYPE: Traylor 60x84, 48x60, 42x48, 24x72. Superior 84x66 & 24x36. Buchanan 30x42. Farrel 60x42, 30x36, 24x36, 18x36, 12x24. Good Roads 1030. Acme 24x40. Misc. 7x12, 9x16, 8x20, 9x24, 12x24, 9x36, 9x30, 15x36.
REDUC. TYPE: Kennedy Nos. 23, 37 & 49. Telsmith 3-F & 46. Traylor 36" Tx, 8", 10", 12". Super. McCully 6" & 10". Newhouse 5, 7 & 10". Symons Cone & Disc Ty. 2' to 4'.
ROLLS: Allis-C. 12½x12, 36x16, 40x15, 54x24 & 72x30. Fairmount 36x60 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc., Etc.
HAMMERMILLS: Williams No. 1, 2, 3, 4, 5 & 9. Jeffrey 36x18 & 36x42. Day Nos. 20 & 40, Etc.
MILLS: Kennedy Ball 4x6, 5x6 & 5x8. Marcy 8x6 & 10x9. Hardinge 6'x3', 8'x30' & 6'x9'. Misc. Tube Mills 5' & 6' x 22'. Sturtevant Ring Roll, Raymonds, Kents, Fuller-Lehigh, Etc., Etc.
CRUSHING PLANTS: No. 65 Diamond. No. 22 Pioneer 8x24. 1030 Good Roads, 9x40 Austin-Western, 9x36 C.R.

MISCELLANEOUS ITEMS
Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Eetc. in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)
ALEXANDER T. McLEOD
7229 Rogers Avenue CHICAGO

FOR SALE
Clamshell buckets—Blaw-Knox—½, ¾, ⅞ and 1 yd.
Dragline buckets—Page—1¼, 1½ and 2 yd.
Shovel—Bucyrus, 50-B, steam, cat mounted, combination.
Locomotive cranes—20-ton and 25-ton, steam.
Boiler—locomotive steel firebox type, approx. 50 H.P., 125 lbs. pressure, code—Removed from Bucyrus dragline.
Shovel dipper—1 yd., full manganese type with ball.
P. A. HENAULT
2140 Book Bldg. Detroit, Michigan

Welding Outfits $29.73 to $76.06. Combination welding and cutting outfits $42.27 up.
Superior Oxy-Acetylene Co.
Dept. W.
HAMILTON OHIO

TRUCK MIXERS

For Defense — **Immediate Delivery**

ROAD AND AIRPORT EQUIPMENT

3—3¼ yard Rex separate engine drive mixers 1936 on dual pneumatic Ward La France, each $2250

1—3 yard Rex separate engine drive mixer 1934 on dual pneumatic A.C. Mack..... 2000

1—2 yard Jaeger separate engine drive mixer 1936 on dual pneumatic Ford V8—1937.... 1950

All in excellent condition

8" x 8" Road Forms and 9" x 9" Road Forms
Jaeger Lakewood Road Finishers—Type C
Jaeger Lakewood Road Finishers—Type D
Cleveland Pioneer Trencher
15 cu. ft. Orange Peel Bucket
Cletrac Tractor Model A-30
Jaeger Jiffy Mast
5 Ton Buffalo Springfield 3 wheel roller
½ yard Speeder Model O Crane—25' boom on Caterpillars
Well Point Systems—Service from Coast to Coast
Other Bargains in Pumps, Building Mixers, etc.

JAEGER LEMBO MACHINE CORP. Northern Boulevard at 127th Street, Corona, L. I., N. Y. Phone Newtown 9-7777

BARGAIN PRICES

ON

RUBBER BELTING

TRANSMISSION—CONVEYOR—ELEVATOR

"V" BELTS

FOR

PUMPS—CRUSHERS—PULVERIZERS—ETC.

RUBBER HOSE

FOR

AIR—WATER—STEAM—ETC.

Partial Stock List

NEW AND HEAVY DUTY

Conveyor and Elevator Belting

Quantity	Width	Ply	Top Cover	Bottom Cover	Type
500 Ft.	48"	8	1/8"	1/16"	Conveyor
505 "	36"	6	1/8"	1/16"	"
856 "	30"	6	1/8"	1/16"	"
458 "	30"	5	1/8"	1/16"	"
1905 "	24"	5	1/8"	1/32"	"
250 "	24"	6	1/16"	1/16"	Elevator
1298 "	24"	4	1/8"	1/32"	Conveyor
250 "	22"	8	1/16"	1/16"	Elevator
210 "	22"	8	Friction		"
874 "	20"	5	1/8"	1/32"	Conveyor
1765 "	18"	4	1/8"	1/32"	"
750 "	16"	4	1/8"	1/32"	"
1509 "	14"	4	1/16"	1/32"	"
310 "	12"	6	Friction		Elevator
356 "	12"	4	1/16"	1/32"	Conveyor
226 "	10"	6	1/16"	1/32"	Elevator

We will cut any of above rolls. Advise desired lengths and widths and we will promptly quote prices. Many other sizes in stock for immediate shipment.

CARLYLE RUBBER CO., Inc.
62 Park Place — New York, N. Y.

LOCOMOTIVES SHOVELS — CRANES

Attractive Prices

1—80 Ton American 0-6-0 Switcher.
2—40 Ton American Saddle Tanks.
1—38 Ton Porter Saddle Tank.
2—25 Ton Plymouth—Gasoline. Standard Gauge—Rebuilt
15—Modern Covered Hopper Cement Cars.

1—Marion 480 Combination Steam Shovel and Crane.
1—52-B Bucyrus Dragline 70 ft. Boom, Atlas Imperial Diesel Engine.
1—15-ton Industrial 8 Wheel Steam Locomotive Crane.

Birmingham Rail & Locomotive Co.
BIRMINGHAM, ALA.

RAILS—1 Ton or 1000

NEW RAILS—5000 tons—All Sections—All Sizes.
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—New—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money.
'Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

Monighan 4-W Dragline. B-E 37-B Diesel dragline.
Northwest 95 Dragline, 75' bm. P&H 900 Diesel. Loc. Cranes—15 to 30 ton steam; 10-ton gas. Shovels—Bucy. 50-B, P&H 1250, Marion 125 Elec.; Marion 471-481, P&H 750-900, L-B K-55 Diesel & Gas.
For Rent—3 yd. Diesel drag.; 1¼ yd. gas shovel. Drag Scraper & Slackline Equipment, ½ to 4 yd. Bucket Loaders—Barber-Greene-Haiss-Link-Belt. Vib. Screens—1-2-3 deck, 3x6-3x8-4x6-4x8-5x8-4x10.
JAMES WOOD, 53 W. Jackson Blvd., Chicago, Ill.

¼, 1, 1¼ yd. Owen & Williams Buckets
30, 35 HP Gas Hoists
50, 60, 100 HP Elec. Hoists
1¼ Nwest Shovel Attachment
1¼ B-Erie 41B Shovel attachment
1 yd. Page Dragline Bucket
½, ¾, 1¼ Gas Crawler Cranes

J. T. WALSH
Brisbane Bldg. — Buffalo, N. Y.

SPRING VALUES!

22¾ ton Browning Locomotive Crane, 50' Bm.
1¼ Yd. Lorain 57 Diesel Crane-Shovel, 1938.
1 yd. Manitowoc Speedcrane Dragline-Shovel.
120, 100, 240 HP Fairbanks Diesel Engines.
8B Telsmith Roller Brg. Gyratory Crusher.
8—50 ton All Steel Gondola Ballast Cars.
5 yd. All Steel Clamshell Dredge, 110' boom.
Ingersoll Rand 2700 ft. Elec. Air Compressor.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. — St. Louis, Mo.

NEED DUMP CARS?

FOR SALE 200

20 and 30-yard Capacity—All-Steel—Clark, Magor, Koppel and Western—Both Up-turning and Down-turning Door Types
Immediate Delivery!!! All Priced to Move Quickly
ALSO LOCOMOTIVES, CRANES, SHOVELS

IRON & STEEL PRODUCTS, INC.
36 YEARS' EXPERIENCE
13402 S. Brainard Ave., Chicago, Illinois
"Anything containing IRON or STEEL"

DUMP CARS

15 KOPPEL

24 in. gauge all steel 2 way dump. U body. Roller bearing.

DICK EVANS

Room 527 — 53 W. Jackson Blvd.
Chicago, Illinois

USED BARGAINS

12-Ton Plymouth Standard Gauge Locomotive
2-Yard Sauerman Heavy Weight Scraper with No. 2500 Hoist
Allis-Chalmers Model LO Tractor with 7-Yard Scraper and Hydraulic Bulldozer
All in rebuilt condition
Marion Model 37 Steam Shovel in excellent shape

H. B. FULLER EQUIPMENT CO.
1836 Euclid Ave.
Cleveland, Ohio

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.
Fort Wayne, Indiana

Used Equipment Wanted

CEMENT MACHINERY WANTED FOR THREE PLANTS

For 50, 100, and 150-ton capacity per 24 hours with or without diesel plants. Will act quickly if price attractive. Please write full details to Cia. Occidental de Maquina ria y Metales, S. A., Constitucion, 203, Mazatlan, Sinaloa, Mexico.

WANTED

One Vulcan 6 or 7 ton, 36" Gauge Gasoline Locomotive. When replying state price, condition and present location. Address Box 990, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

"E. C. A." REBUILT EQUIPMENT means MORE profits!

Below is a partial list of our large stock. Send for complete list

AIR COMPRESSORS
Portable and stationary, belt with elec. or gas power, sizes from 20 cu. ft. to 1,000 cu. ft.

BINS
13—1 150-ton Johnson, 3 comp; 1—150-ton Blaw Knox, 2 comp; 1—120-ton Blaw Knox, 4 comp; and the following 2 comp. bins, 2—118-ton Blaw Knox, 1—117-ton Blaw Knox, 2—72-ton Blaw Knox, 1—75-ton Butler, 1—51-ton Blaw Knox, 1—35-ton Blaw Knox, 2—30-ton Johnson. Above with or without weigh batchers.

BUCKETS
26—Clamshell, all sizes and types; Williams, Blaw Knox, and Owen.
6—Dragline; 1—1¾ yd. Northwest; 1—1½-yd. Omaha; 1—1¼ yd. Page; 2—1 yd. Hayward; 1—¾ yd. Page.
1—1½ yd. Pioneer Cableway Excavator bucket.
7—Dragscraper; 2—1 yd. Sauerman; 1—1 yd. Green; 1—⅜ yd. Garst; 2—½ yd. Garst.

CRANES, DRAGLINES and SHOVELS
1—Link-Belt, K-55, Serial No. 1698, 70' boom, 2-yd. bucket, also have 2 yd. shovel attachment.
1—Link-Belt K-48, Serial No. 1728 with 60' boom 2 yd.
1—Northwest Model 5, Serial No. 3572 with 50' boom, 1½ yd.; also pull shovel 1¼ yd. and
3—Northwest Model 4, Serial No's. 3441, 3445, 3495 with 40' boom 1 yd.; also 1-yd. pull shovel.
1—Bucyrus Erie 1½ yd., 33-B, A.C. electric tunnel shovel.
1—Northwest Model 104, Serial No. 2079, 45' boom, 1½ yd. bucket; with 1 yd. shovel attachment.
1—Link-Belt Model K-42, Serial No. 1265, 45' boom, 1¼ yd. bucket, also 1 yd. trench hoe attachment or 1¼ yd. shovel front.
2—Northwest Model 105, Ser. Nos. 2556, 1645, 40' boom, 1 yd. bucket with one shovel attachment.
2—Osgood Heavy Duty, Serial No. 2069 and 2087, 40' boom, 1 yd. bucket and with 1 yd. shovel attachment.
1—Thew ⅝ yd. Gasoline Shovel with ⅝ yd. shovel front and 40' crane boom. Serial No. 2801.
1—Koehring Model 301, Serial No. 544, 40' boom ⅝ yd. bucket.
1—Northwest No. 2 crane, new 1937 with 40' boom.
1—Byers Bearcat Model 27, Serial No. 5289, 20' boom, ½ cl. sw., ½ yd. bucket.
1—Erie Steam Crane Shovel with 40' crane boom, with or without ¾ yd. shovel front.

LOCOMOTIVES
12—Electric and gas power standard 36" and 24" ga.; 1 12-ton Plymouth, standard ga.; 1 7-ton Plymouth, 4 7-ton Whitcomb, 1 6-ton Brookville, 1 6-ton Whitcomb, 2 4-ton Vulcan, 2 4-ton Whitcomb, 1 3½-ton Plymouth, 1 3-ton Whitcomb.

CRUSHERS
5—Gyratory crushers: 1—No. 5 Allis-Chalmers; 1—No. 5 Austin; 1—No. 5 Gates; 1—No. 3 McCully; 1—No. 0 McCully.
10—Jaw Crushers; 3—15x36" Universal; 1—15x26" Cedar Rapids; 1—15x26" Champion; 1—12x20" Acme; 2—10x20" Climax No. 2½; 1—9x16" Telsmith No. 9A; 1—9x15" Champion.
1—Set of Allis-Chalmers, smooth type crushing rolls, 42x16".

DERRICKS
4—All steel stiff leg derricks:
1—25-ton Just with 77' boom;
1—18-ton Dobbie with 75' boom;
1—15-ton Just with 65' boom;
1—5-ton American with 75' boom.
11—Steel Guy Derricks; 7—20-ton American-Terry 90' mast, 90' boom;
1—15-ton Terry with 115' mast, 100' boom; 1—10-ton American with 115' mast, 110' boom, both with 16' bull wheels; 1—6-ton Bedford with 90' mast, 80' boom.

HOISTS
1—2 Yd. Thomas 2 speed Class L Cableway excavator hoist with 150 HP electric motor.
1—National 50 HP dragscraper hoist for handling 1 yd. bucket with 50 HP electric or gas power.
1—1 Yd. Cedar Rapids 2 speed dragscraper hoist with 50 HP electric or gas power.
1—1 Yd. Kern variable speed dragscraper hoist powered by 50 HP electric motor.

PNEUMATIC TOOLS
36—Rock Drills, mounting, wagon, column or tripod.
53—Jackhammers, various makes & sizes.

PLEASE SEND FOR A COMPLETE STOCK LIST

EQUIPMENT CORPORATION OF AMERICA

PHILADELPHIA—1506 Race St. Phone: Rittenhouse 4664
CHICAGO—1119 So. Washtenaw Ave. Phone Nevada 2400
PITTSBURGH—P. O. Box 923. Phone Federal 2000

CONCRETE PLANTS—EQUIPMENT
Ready-mixed concrete batching plant, 5 compts., 1000 yds. aggregates, 750 bbls. cement, automatic weigh batcher, full electric or manual.
225 tons, 4 compt. bin, weigh batcher.
Butler 100 yd. 2 compt. bin, weigh batcher.
2—115 tons Johnson bins, 2 compt.
Steel bin, 75 yds., single compt., sand and gravel.
Beaumont 42 yd. two compt. bin.
MultiFoote 27-E paver, with 40 ft. tower.
200 ton rock storage bin, steel, heavy construction.
Fuller Kinyon bulk cement unloader, portable.
Fuller C40 rotary air compressor, electric.
Smith 1 yd. tilting mixer, electric.
Ransome 1 yd. mixer, electric, practically new.
Koehring 27-E paver with boom and bucket.

BUCKETS—STONE SKIPS
22—Steel stone skips, 2 to 3 yds.
1½ yd. heavy duty Blaw Knox digging bucket.
1¼ yd. heavy duty Blaw Knox, digging, clamshell.
1½ yd. Hayward rehandling clamshell.
1 yd. Hayward clamshell, rehandling.
¾ yd. Hulse rehandling, clamshell.
1 yd. Hayward orange peel, 4 leaf.
¾ yd. Hayward orange peel, 2 leaf.

SHOVELS—CRANES
2—Marion Diesel shovels, 1—¾ yd. cap.
No. 50 Bucyrus Erie steam shovel, 2 yds. cap.
No. 50-B Bucyrus Erie electric shovel, 2 yds.
Bucyrus Erie electric tunnel shovel, 1 yd. cap.
Northwest 1 yd. comb. shovel-crane, gas.
Brownhoist 10 ton crane, gas, 40 ft. boom.

TRACTORS
RD-8 Caterpillar, with bulldozer.
RD-7 Caterpillar, with bulldozer.
Allis Chalmers Model 35, with bulldozer.
Caterpillar Model 30, with L.P. bulldozer.

LOCOMOTIVES—CARS
Plymouth 14 ton, gas, standard gauge.
Whitcomb 12 ton, gas, standard gauge.
2—Whitcomb 4½ ton, gas, standard gauge.
8—3 yd. V type 36" ga. side dump cars.

CRUSHERS—PLANT
Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 32, 3A, 5B; Traylor 8"; McCully 12", 8", 6".
Jaw: 6x15, 9x16, 10x20, 12x26, 13x30, 15x30, 16x32, 36x48, 48x60.
Complete portable rock crushing plant, nearly new, with crusher, elevator, screen, etc.

RICHARD P. WALSH CO.
30 CHURCH STREET NEW YORK

USED EQUIPMENT
IMMEDIATE DELIVERY

	Condition
1—9" x 16" bronze bearing DIAMOND jaw crusher complete with flywheels and Model P2877D2 LeRoi motor mounted on trailer unit with steel wheels	New
2—Pitman assemblies with S.K.F. bearings including main bearings for 10" x 20" jaw crusher	New
1—15" x 36" roller bearing DIAMOND jaw crusher	New
1—15" x 36" pitman assembly—new design with 8" shaft, including main bearings	New
1—Bucket elevator 32'0" centers, rigid type, with buckets 12" x 6" x 7¾" mounted on belt	New
*5—Pitman assemblies for 10 x 20 jaw crusher, bearings S.K.F. type	Slightly Used
*1—Pitman assemblies for 10 x 20 jaw crusher, bearings Timken type	Rebuilt
1—10 x 20 roller bearing DIAMOND jaw crusher equipped with Timken bearings	Rebuilt
*3—10 x 36 pitman assemblies for 10 x 36 jaw crusher	Rebuilt
*1—15 x 36 pitman assembly complete	Rebuilt
1—20'0" bucket elevator with buckets 10" x 6" x 7¾" mounted on chain	Rebuilt
1—30" x 10'0" double shaker screen	Slightly Used
1—Grizzly and hopper 6'8 x 6'8—with 8" sq. openings and 20" x 2'0" plate feeder	Good Condition
2—Quarry plants with 10 x 20 anti-friction bearing jaw crushers and bucket elevators, mounted on trucks with four steel wheels	New
2—30 cubic yard bins, 2-compartment, no jack legs	New
1—No. 25 hog, anti-friction bearing type with cast steel discs	New
6—Steel wheels 40" dia. x 10" face to take 4" Hyatt bearings	New
4—Steel wheels 40" dia. x 10" face to take 4" Hyatt bearings	New
4—Steel Wheels 28" dia. x 4" face, bore 1⅞"	New
10—Steel wheels 28" dia. x 5" face, bore 1-15/16"	New
8—Steel wheels 24" dia. x 3½" face, bore 1⅞"	New
4—Steel wheels 28" dia. x 14" face, bore 4" Hyatt	New
1—Allis-Chalmers motor, 25 hp.	Reconditioned
1—Allis-Chalmers motor, 60 hp.	Reconditioned

*The above pitman assemblies can be installed in new bases and furnished as complete machines.

DIAMOND IRON WORKS, INC. AND MAHR MANUFACTURING CO. DIV.
MINNEAPOLIS, MINNESOTA

Used Equipment For Sale

This equipment located at plants of Muskogee Gravel Company, Near Muskogee, Oklahoma.

CRANES
1—Orton-Steinbrenner, 1¼ cubic yard Track Crane, with 50 foot boom. This machine has been converted into a gasoline powered unit by installing a Caterpillar 60 H.P. Motor, chain driven. It is now in operation and will have to be seen perform to appreciate its efficiency. In good mechanical condition.
1—¾ cubic yard, crawler type, 35 foot boom, crane, made by General Excavator Company, in good mechanical condition.
1—½ cubic yard, crawler type, 20 foot boom, three-quarter swing, Byers Manufacturing Company.

DREDGE PUMPS
1—V-Belt driven—8" Morris, heavy duty.
1—Belt driven—6" Morris, C. I. Pump.
1—Belt driven—3" Centrifugal pump.

DERRICKS
1—Fabricated Steel Stiff-Leg, 70' Boom.
1—Fabricated Steel Guy Derrick, 40' Mast.

HOISTS
1—Double Drum Hoist—Steam Power.
1—Double Drum Hoist—No Power Unit.

BUCKETS
1—2 cubic yard drag line bucket, with carriage.
1—1 cubic yard Clamshell.
1—¾ cubic yard Clamshell.

CRUSHER
2—9" x 16" Jaw Crushers.

BUCKET ELEVATORS
1—70' length of 9". All on belts.
1—80' length of 12". Gears and pulleys
1—60' length of 16". for each.

SCREENS
1—4' x 12' Revolving Screen.
1—6' x 3' Shaker Screen.

CUTTER
1—Diamond Cutter—Length 30'—For 10" Dredge Boat.

This is surplus equipment on hand and can be bought worth the money.

Muskogee Gravel Company
321 Commercial National Building
Phone 4085 — Muskogee, Oklahoma

FOR SALE

KILNS: 8' x 80', 9' x 142', 9' x 160'
DRYERS: 5' x 35', 5½' x 32', 4' x 40', 5'6" x 40', 5' x 50'
CRUSHING ROLLS: 6" x 5", 24" x 14", 42" x 16"
JAW CRUSHERS: 16" x 24", 10" x 36", 48" x 60"
BALL MILLS: 5' x 8', 6' x 8', 6' x 22'
HARDINGE MILLS: 4½' x 16", 5' x 22", 6' x 22", 8' x 30"
RAYMOND MILLS: Nos. 0000, 00, 1. Also 3, 4 and 5 rolls
HAMMER MILLS: Williams, Gruendler, J. B., etc.

We Purchase Single Items to Complete Plants.

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DIESEL ENGINE GENERATOR SETS 219 kva., G.E., Buckeye horiz. low compression 2200/440/220 V.A.C.
HOIST—100 HP. Lidgerwood double drum Speedwell with 100 HP. A.C. or D.C. Motor.
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A.C. LOCOMOTIVE—6 ton Atlas 36" ga.

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Pittsburgh, Pa.

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125 H.P. Heavy Duty Electric Scraper Hoist

2½-Yard Heavy Duty Crescent Scraper

½-Yard Crescent Scraper

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3 Kritzer & Schultless Hydrators.

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DIESEL: 602, 807 & 1000 Ft.
PORTABLE GAS: 110,160,220,310,540 & 1200 Ft.
STEAM: 49, 310, 528, 1300, 2200 & 3600 Ft.

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Owen R A & H Stone Grapples.
2 Yd. OWEN Type S Material Handling.
1½ Yd., 1 Yd. & ¾ Yd. HAYWARD Class E.
48 Steel Skips 6½ x 6 x 2½.
5 Ton Bucyrus Rock Grabs.

CRANES AND DRAGLINES
⅜ Yd. 5 Ton G & S 30 Ft. Boom.
12 Ton NORTHWEST 50 Ft. Boom Gas.
20 Ton LIMA, 750 Diesel, 65 Ft. Boom.
25 Ton BROWNING & 30 Ton AMERICAN Loco.
25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.

CATERPILLAR SHOVELS
¾ Yd. Lima Diesel.
2 Yd. Marion Steam Shovel.
¾ Yd., 1¼ Yd.,2 Yd. & 4 Yd. MARION Electrics.
1 Yd. NORTHWEST Gas.
1½ Yd. LIMA Diesel.
1½ Yd. BUCYRUS 41B Steamer.
4 Yd. Bucyrus 120B Electric. Also 3 yd. Erie Elec.

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46—KOPPEL 1½ Yd. 24 & 30 In. Ga., V Shaped.
15—2 Yd., 3 Yd., 4 Yd., 6 Yd., 12 Yd., 36 In. Ga.
20—Std. Ga. 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.
15—Std. Ga. 50 Ton Battleship Gondolas.

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9—50 ton std ga. heavy duty flat cars.

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Gas: 15, 20, 60, 100 & 120 HP.
Electric: 20, 52, 80, 100 & 150 HP.
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75, 90, 180, 200 HP F. M. Engines.
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4x16, 5x18 & 5x22 Tube Mills & 6'x22'.
3½ x 8 & 5x7 Air Swept Tube Mills.
2x4½, 6x12 & 5x12 ROD MILLS.

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JEFFERY 24x20 & No. 1 Sturtevant Ring Roll.
RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
RAYMOND Imp. Mills No. 4, 32 & 55.
GRUENDLER XXB Mill & Jay Bee No. 2 & 4.
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STEEL STORAGE TANKS
10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.

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116 Ton Blaw Knox 2 Compt.

400 BARREL CEMENT BIN
400 Barrel Butler Portable Steel Cement Bin with Fuller automatic batcher, push button control.

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8, 10 and 14 ft. Separators, Gayco & Bradley.

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36x60 Fairmount & 36x20 Diamond.

JAW CRUSHERS
10x8, 13x7½, 14x7, 15x9, 15x10, 16x9,16x12,16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 26x12,30x15,30x13, 36x15, 36x30, 36x18, 36x14, 36x9,36x6,36x10,36x24, 42x9, 48x42, 48x36, 60x42, 84x66, 36x16, 9x36.

CONE & GYRATORY CRUSHERS
42 in. McCully Mammoth Gyratory.
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4—10 TZ Traylor 4 ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
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17 Gates K—Nos. 2, 4, 5, 6, 7½, 8 & 9½.
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6, 10 & 13 Inch Superior McCullys.

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100 K.W. RIDGWAY 3/60/2200-250-275 volt.
150 K.W. GEN. ELEC. 3/60/2200-250-275 v.
200 K.W.RIDGWAY 3/60/2200-250-275v.,900 rpm.

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(3) 100 H.P.GEN.ELEC.3/60/440v.,900-1200 rpm.

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BELT: 1000 Ft.60 In.,700 Ft.40 In., 600 Ft.36 In., 800 Ft.30 In., 1642 Ft.24 In.,517 Ft.20 In., 297 Ft.16 In., 500 Ft.16 In.,300 Ft.14 In.
IDLERS: 54 In.,42 In.,36 In.,30 In.,24 In.,20 In.,18 In.,16 In. & 14 In.
Head & Tail—Pulleys—Takeup for all sizes.
Steel Frames: 2,000 Ft.24 In.,30 In.&36 In. Sections.

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36 In.x30 Ft., 3 Ft.x30 Ft., 4 Ft.x30 Ft., 54 In. x 30 Ft.,42 In.x24 Ft.,5 Ft.x30 Ft.,5 Ft.x16 Ft.,5 Ft.x60 Ft.,6 Ft.x60 Ft.,6 Ft.x20 Ft., 6 Ft.x70 Ft.,10x50,7½x100 & 8x110 Ft.Kilns.

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GUY: 8 Ton 85 Ft. Boom, 15 Ton 100 Ft. Boom, 20 Ton 115 Ft. Boom, 50 Ton 100 Ft. Boom.
STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft. Boom,25 Ton 100 Ft.Boom,75 Ton 135 Ft.Boom.

LOCOMOTIVES
GASOLINE: 3 Ton,5 Ton,8 Ton,12,14,and 30 Ton.
STEAM: 9 Ton,20 Ton,40 Ton,60 Ton & 80 Ton.
ELECTRIC: 2 Ton, 5 Ton, 8 Ton, 40 Ton.
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Gyratory: Kennedy No. 25, Traylor No. 8
Rolls: Garfield 54"x20, Allis Chalmers 36x16", Jeffrey 24" x 20" type B
Mills: Bonnot Air Swept ball 54"x8' with air separator, Jeffrey 24"x20" Hammer
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Link Belt single deck 2'x8' vibrating with feed gate
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Railway: 1500 feet 24" track with curves and switches
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5—24" V shaped ⅝ yd. side dump cars
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5—24" V shaped 1¼ yd. side dump cars
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2—36" gauge 2 ton Mercury Locomotives
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Portable Barber Greene 18"x44' trough
Trough & return idlers for 12" to 30" belt
120 head and tail pulley assembly for belt conveyors
90' 30" gravity rolls in 10' sections ⅝" apart
950' of 36" 6 ply conveyor belt
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Dragline buckets: 1½, 1 and ½ yd.
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10 centrifugal pumps
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625 Feet Industrial Steel Rail—1⅛" x 2½" x 2⅜".
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1—No. 3 Northwest Crane 40' boom
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1—No. 6 and No. 7 Northwest Crane and Dragline
1—50 ton Steam Locomotive Crane
2—No. 1 and 1—No. 2 Vulcan Pile Hammers
1—400 and 1—E2 Pile Extractors
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1—50, 60, 75 and 100 h.p. gasoline Power Units
1—¼ yd., ⅜, & 3—¾ yd. and 1—1 yd. Clamshell buckets
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1—Allis Chalmers WM Hough Loader
1—12 by 24 Blake Type Jaw Crusher
1—9 by 14 Jaw Crusher
1—Limestone Pulverizer 7 to 8 tons per hour 15 tons road rock
2—Allis Chalmers Power Pulleys for K and M tractors
2—¾ H.P. electric motors 115 Volt D.C.
1—Truck scale and platform 12½ ton capacity
10—Tons 35-lb. rails
2—Kohler Light Plants 1500 watts

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1—Gruendler Pulverizer 3XA size

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1—All steel on heavy chain bucket 16" wide by 8 x 11¾, 58' centers.

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1—Gardner Denver Type ABJ capacity 672' actual air, 2 stage multi cylinder with combination radiator for cooling jacket water and intercooling compressed air, V belt drive, 150 H.P. motor all on structural steel base, used 6 months.
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1—Sullivan Tandem compound air compressor 1000 cu. ft. steam.

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2—24" belt conveyors, 225' centers, mechanical parts only.

JAW CRUSHERS

10 x 15 to 56 x 84.

GYRATORY PRIMARY AND REDUCTION CRUSHERS

All makes and sizes.

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1—12 x 30 Buchanan Jaw Crusher.
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1—Kennedy Model 19 gearless.
1—Traylor 3' finishing crusher.
1—Set Allis Chalmers 16" x 36" crushing rolls.
1—Set Allis Chalmers 14 x 24" crushing rolls.

LOCOMOTIVE CRANES STEAM

1—22 ton 55' boom double drums.
1—15 ton 50' boom double drums.

CRANES CRAWLER TYPE

1—2 yd. capacity 60 or 70' boom double drums clamshell crane or dragline, capacity 65,000 lbs. at 15' radius, weight 130,000 lbs., 100 H.P. 3 phase, 60 cycle, 440-2200 volt motor.
1—2 yd. diesel crawler tread crane.

CRANES OVERHEAD ELECTRIC

2—10 ton capacity 72'3" span bucket operating 220 volt DC.

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1—Sullivan electric dragscraper or sluicing hoist double drums 60 H.P. 440-2200 volt AC motor.
1—Sauerman steam slackline or cableway hoist, cylinders 10 x 12.
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1—78" diameter 72" face 300 H.P.
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2—450 H.P. 4 cylinder 4 cycle solid injection 225 RPM with or without 300 KW AC 2200 volt generators.

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1—100 H.P. 440 volt AC to 65 KW 230 volt DC.

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2—6' and 7' x 100'.

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1—6' x 60' single shell.
1—6' x 30'.
1—54" x 40'.

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2—55 ton Vulcan steam, built 1923, power reverse, air operated fire doors. National Board Boilers, used 11 months for sale or rent.
6—Plymouth and Whitcomb 7, 8, 12 and 14 tons gas locomotives.

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6—Vulcan and Porter locomotives 15 to 25 tons steam 36" gauge.
6—Plymouth and Whitcomb 5, 7, 12 and 16 tons capacity 24" and 36" gauge.
6—4 ton storage battery locomotives 36" gauge.

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2—Smith 56S capacity 2 yds.
1—Smith 84S capacity 3 yds. tilting type mixers with AC motors.

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2—42" Fuller Mills.
1—Sturtevant No. 1 Ring Roll Mill.
1—Allis Chalmers 3½ x 12 tube mill.

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1—Morris 10" dredge pump managanese fitted belt drive.

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2—4 x 10 double deck heavy duty.
1—New Holland 2 x 6 single deck.
1—Nordberg 2 x 8 single deck.
1—3 x 8 double deck with motors.

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2—8' x 12'7" Allis Chalmers one left hand and one right hand drive.

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1—Northwest ⅜ yd. capacity full revolving 4 cylinder gasoline motor.
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1—Osgood and 1—Marion 1¼ yd. capacity steam.

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6—10,000 gal. capacity cylindrical horizontal oil storage tanks.

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RESEARCH AND DEVELOPMENT ENGINEER
Specialized in Radical Cement Kiln Improvement and Efficiency Work
Now available. Has built more than 300 experimental furnaces. Made 18 inventions. His cement kilns are internationally known and save 2 million dollars yearly. War conditions compel occupational change. Age 56 and still keen for new problems. Prefers work with cement mill equipment manufacturer or large cement company. Address Box 988, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

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Open for position at once—Familiar with the latest equipment and methods used in heavy production as well as portable crushing plants, the quarrying to suit conditions and the handling of labor and machinery successfully. I have reduced operating expenses. Am 51 years of age and equal to the severest task. Midwest or Eastern location preferred. Address Box 977, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED — MECHANICAL engineer, 40 years in building and operating stone crushing plants, and operating quarries. References. Have built 35 plants in 19 states. Handled 95 men on one job. Have installed 50 ton castings. "Experience is the best Teacher." Address Box 985, care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

POSITION WANTED — BY EXPERIenced salesman familiar with Crushed Stone, Agricultural and finely pulverized limestone. A permanent connection with future possibilities desired. Address Box 986, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

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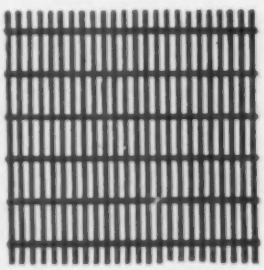

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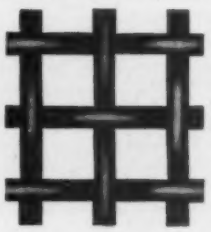

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In all phases of life experience is the best teacher. The 1941 Industrial Brownhoist Crane for example is the result of over 50 years of brainwork and toil—of engineering research and experiment — of hundreds of operating tests under a wide variety of conditions. The crab mechanism operates with a smoothness never before thought possible. The Power plant develops a maximum of power with a minimum of fuel consumption. Cabs allow greater visibility. The undercarriage is built with a greater strength and power than ever before. Largely because of the many years experience in building cranes, the modern Industrial Brownhoist crane does an unusually low-cost job of material handling.

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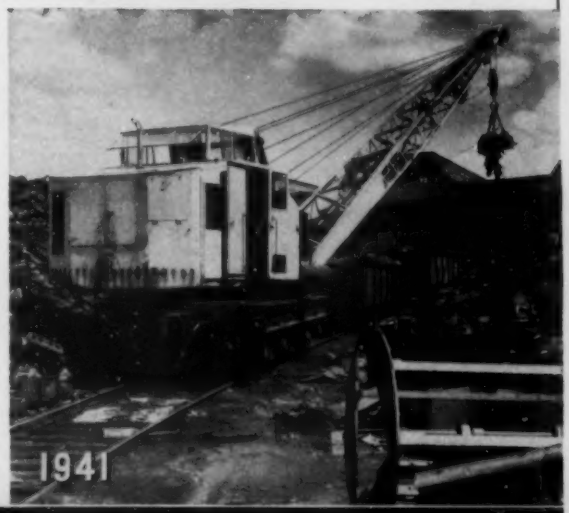

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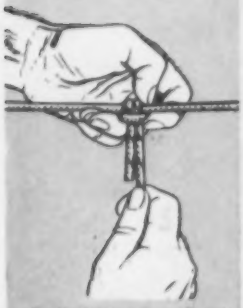
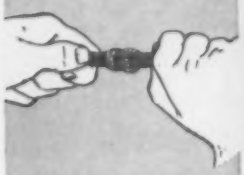
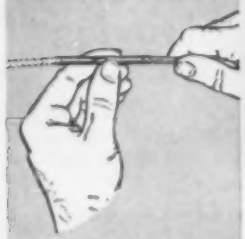
1. Tie through cartridge.



2. Half hitch branch to main line.



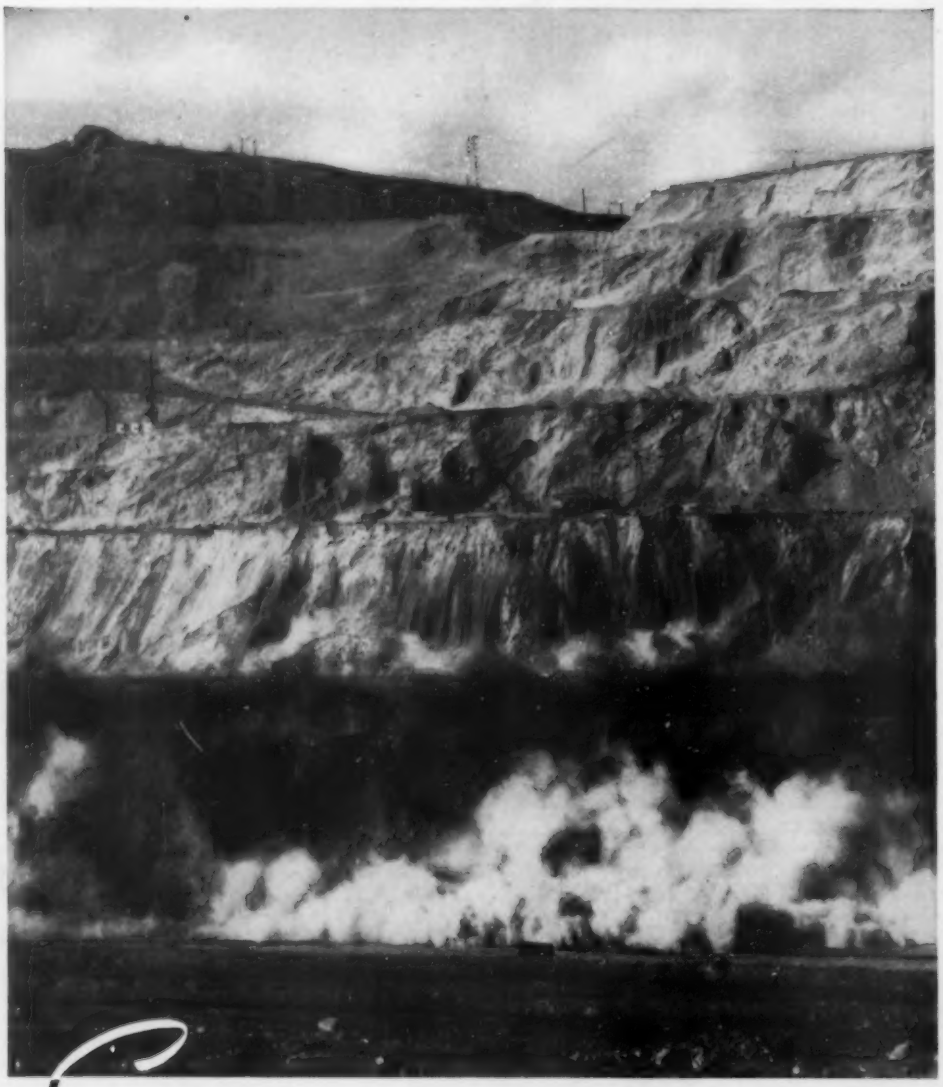
3. Connect main line lengths with square knot.



4. Fuse and cap on end of main line.

IMPORTANT

Branch lines should lead away from main lines at *right angles*. Avoid kinks and small loops.



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PB21

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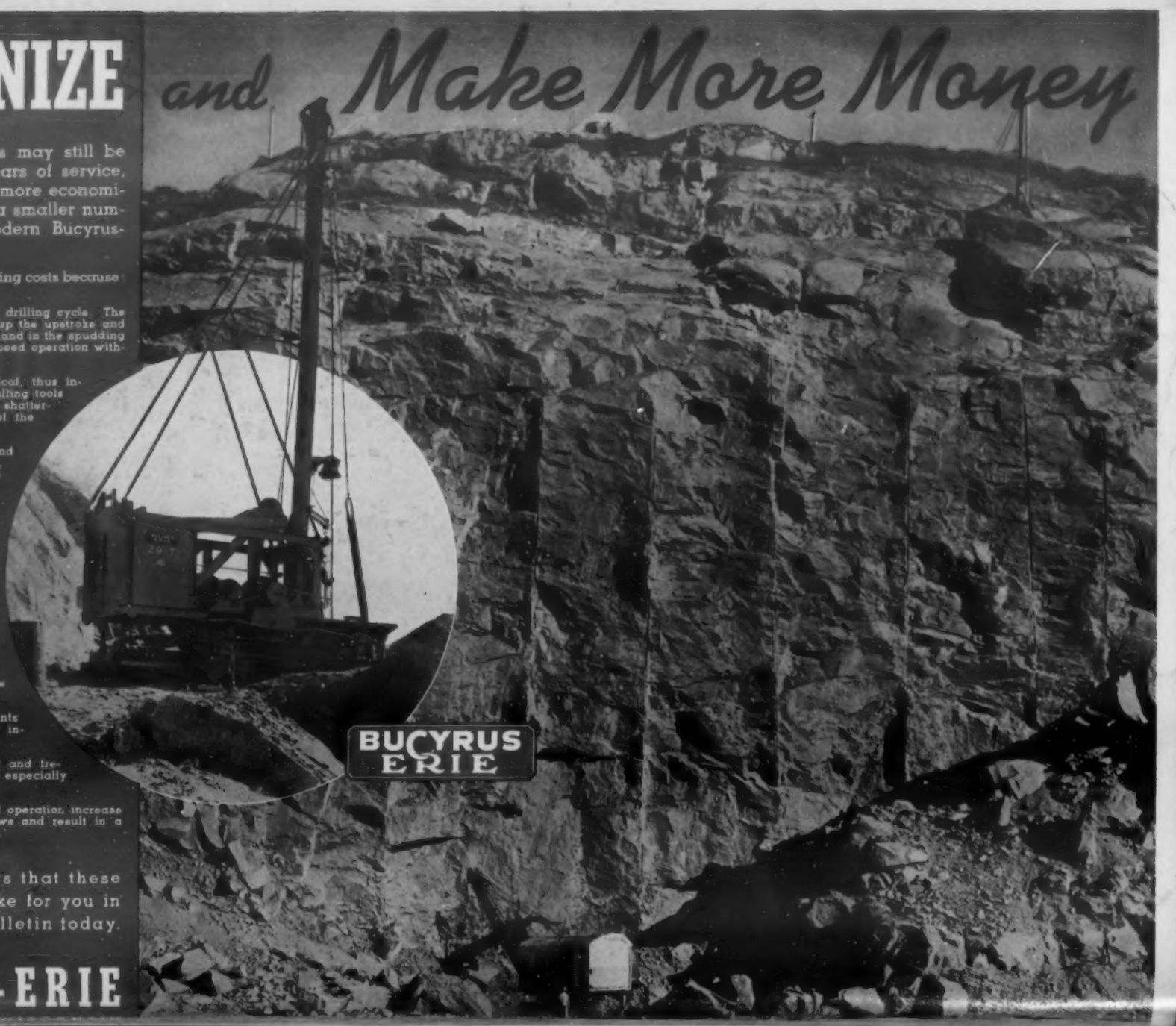
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